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## Abstract

I use spatial and temporal variation in temperature shocks to examine the effect of adverse weather conditions on the onset of social conflicts in seventeenth- and eighteenth-century France. The paper's contribution is threefold. First, I document the effect of temperature shocks on standards of living using cross-section and panel prices data. Second, I link high-resolution temperature data and a new database of 8,528 episodes of social conflicts in France between 1661 and 1789. I use a linear probability model with subregional and year fixed effects to establish a causal connection between temperature shocks and conflicts. One standard deviation increase in temperature increased the probability of social conflicts by about 5.3 per cent. To the best of my knowledge, these results are the first to quantify the effect of temperature shocks on intergroup conflict in pre-industrial Europe. Finally, I investigate the role of local leaders– the intendants– in the mitigation of temperature shocks. I show that leaders with higher level of local experience were better able to cope with adverse weather conditions. I argue that years of local experience were a key determinant in the intendant's ability to administer efficiently his province. This interpretation is supported by historical evidence.

JEL Codes: H12, N53, Q54

Keywords: Weather shocks, Institutions, Social Conflicts, Grain Prices, France, Ancien Régime

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# 1 Introduction

Natural hazards and weather shocks lead populations to experience highly unstable socio-ecological environments. With global warming, the revival of this phenomenon reaches public debates in developed countries. For instance, in October 2016, the French agricultural Minister was constrained to announce a set of drastic temporary measures to cope with the expected decrease in farmers' revenue the following disastrous weather conditions during the preceding summer and spring.[1] In developing countries, where reliance on agriculture and primary goods is substantial, "climate change can indirectly increase risks of violent conflicts in the form of civil war and inter-group violence by amplifying well-documented drivers of these conflicts such as poverty and economic shocks" (Field et al., 2014, p. 19).

In fact, this phenomenon is not only relevant nowadays by affecting at different scales both developed and developing economies. It is also and mainly a historical phenomenon. Recent research documents the link between climatic stress, and its impact on the economy, to political instability in pre-industrial societies (Christian and Elbourne, 2018; Manning et al., 2017; McMichael, 2012). Over time, it also shaped episodes of food shortages, famines, population displacements and violence.[2] For instance, two centuries ago the Southern region of France, Languedoc, experienced repeated floods that damaged the harvest of crops and resulted in an estimated loss of more than nine millions *livres tournois* (hereafter £) leaving many peasant households on the brink of poverty.[3] A few months later, on 25 April 1773, a group of women gathered in front of the palace of the intendant of Languedoc in the city of Montpellier, to protest against the scarcity of grains. Emmanuel de Guignard de Saint-Priest, the intendant, reassured them that there was no shortage, but failed to prevent the crowd from searching for hoarded grains in merchant facilities.[4] Soon after, the intendant summoned every grain

[1] Heavy rains and the lack of sunshine around the crop flowering period inhibited the yield potential of the crops as a whole. Water deficit and dryness during summer further reduced potential yields leading to a 30 per cent fall from the 2015 harvest, and a fifty-year high drop in French wheat production (Ben-Ari et al., 2016; Ben-Ari et al., 2018, pp. 2–4). The measures included tax deferrals, the advancement of the payment of the Common Agricultural Policy aid, and the possibility of postponing loan repayments. See *Pacte de consolidation et de refinancement des exploitations agricoles*. Ministry of Agriculture, Agrifood, and Forestry, October 4, 2016 (http://agpb.fr/sites/default/files/pacte_consolidation_02.pdf).

[2] Communities were adaptive in the face of these shocks, which contributed to shape human behaviour, political institutions, and culture in the long-run (Degroot, 2018). For instance, Buggle and Durante (2017) document that the exposure to higher climatic risk in pre-industrial times reinforced cooperation in exposed communities. This in turns favoured the emergence of norms of generalised trust and institutions that persisted until today.

[3] In comparison, the average income of a farming household amounted to £200 a year during the 18th century. Archives Départementales (hereafter A.D.) Hérault, C 5458.

[4] Prior to 1789, France was divided into 32 provinces at the head of which was place an intendant appointed by the King. Intendants had power in the sphere of finance, justice, and police, which means that they collected taxes, regulated trade, controlled prices, managed the construction of roads, and provided what relief existed (see Section 2.2).

merchants of the city to gather information on their stocks of grain, and to set a maximum price for wheat.[5] He simultaneously wrote to the Controller-General of Finances in Paris to inform him about the situation and the necessity to provide for the subsistence of the poorest, to distribute grains to peasants who would need it to crop their fields, and to postpone the recovery of taxes. A few weeks later, the intendant received a letter from the Controller-General congratulating him for his actions.[6] By the end of 1773, there had been no more uprising in the city of Montpellier and its surroundings.

In this paper I examine whether variations in the level of local experience of provincial leaders is a plausible mechanism to explain spatial variations in social conflicts triggered by weather-related economic shocks. The intendants were a group of 32 individuals appointed by the Crown on a discretionary basis to administer French provinces. Most of them came from wealthy aristocratic families, had received a legal training, and worked as a high-ranking judicial officer prior to their appointment. The position of intendant often represented an important step in one's career, but rarely the final one, as the average age at first appointment was thirty five. They were usually not appointed in their province of origin and it took them time to learn about the economic and agricultural structure, custom practices, the functioning of local institutions, and the role of local notables in their new province. That means they differed mainly in the level of provincial experience they had, a factor of prime importance to run efficiently the daily tasks associated with their positions. I provide evidence that the set of tools at intendants' disposal, such as tax breaks, grains distribution, and the creation of temporary workhouses, allowed them to implement efficient policies to reduce the negative effects of transitory economic shocks.

I use archival sources and secondary literature to gather detailed information on the professional careers for the universe of French provincial intendants between 1661 and 1789. I combine this new data set with district-level data on the occurrence of social conflicts and fine-grained seasonal temperature data. My estimation strategy is similar in spirit to a difference-in-differences strategy, and compares the likelihood of social conflicts in districts exposed to weather shocks versus those which were not, across provinces administrated by intendants with various years of local experience. I find that provincial leaders with more years of local

[5] A.D. Hérault, C 2875 and C 2914.

[6] "I can only rejoice at the motives, which make you think that it is indispensable to provide for the subsistence of the impoverished inhabitants who lost everything, to supply them with seeds for the next crops, and to postpone the recovery of taxes." A.D. Hérault, C 5458, Letter from Abbot Terray to Emmanuel de Guignard de Saint-Priest, intendant of Languedoc, July 23, 1773.

experience were better able to reduce the onset of weather-induced conflicts.[7] A one standard deviation increase toward warmer temperature increases the probability of social conflicts and food riots by 5.3% (mean = 1.87) and 19% (mean = 0.28), respectively. I show that the effect of temperature shocks was larger in provinces in which a new intendant was just appointed. On average, it took intendants five years of local experience to completely mitigate the effect of temperature shocks. Through years of local experience, the intendants accumulated human and social capital to administer efficiently their province. I argue that this factor is key in explaining the speed and effectiveness of institutional responses to weather-induced shock. This interpretation is supported by historical evidence.

I supplement these findings by providing evidence on the mechanisms underlying the relationship between temperature shocks and conflicts. I collect data on grain prices at (i) the provincial level between 1756 and 1789; (ii) the district level for 1767–8 to analyse the effect of temperature shocks on price volatility, and thus real income. Before the French Revolution, markets were not sufficiently integrated to smooth the effect of weather-induced crop shortages, and increases in temperature shocks significantly raised wheat prices. Given the importance of bread in the household consumption basket, this, in turn, translated into strong negative transitory income shocks for most of the households. I estimate the effect of grain prices on social conflicts via Two-Stage Least Squares (2SLS), where I instrument wheat prices by summer temperature shocks. The level of wheat prices has a positive and significant impact on the likelihood of subsistence-related conflict, which included events like food riots, the looting of public granary and the like.[8]

I further investigate the role of poor relief and its efficiency in pre-industrial Europe by analysing the role of the tithes and monastic charities as a buffer against negative transitory economic shocks. The tithe was a compulsory contribution to religious institutions equal to one-tenth of the agricultural production. The Catholic canon law states that one-third of the income derived from the tithe had to be devoted to poor relief and charity. I collect data on more than one thousand *in commendam* monasteries' income at different points in time.[9]

[7] One concern is that the intendants stayed longer in more peaceful provinces. I address the issue of reverse causality in Section 4.2.

[8] These results are in line with recent studies documenting the importance of temperature in explaining winter wheat yield volatility (Albers, Gornott and Hüttel, 2017; Ben-Ari et al., 2016, 2018). They are also consistent with previous historical research emphasising the role of weather-related disasters as drivers of some social upheavals in early modern France (Le Roy Ladurie, 1974, 2006; Lefebvre, 1972, pp. 339–74; Nicolas, 2002; Rudé, 1964).

[9] Monasteries *in commendam* had abbots and abbesses, appointed by the king, who had no religious activities and exercised no authority over the inner monastic discipline. However, they drew a significant share of abbeys' income, which they used to cover their personal expenditures.

I provide evidence that the tithes often represented a significant– up to half– share of their total income, but that monasteries often failed to respect the canon law regarding the use of the tithes. I then compare the effect of weather shocks on the likelihood of social conflicts between districts where total monasteries' income per capita was high to districts where total monasteries' income per capita was low. I find that districts in which monasteries' income per capita was higher were less resilient to temperature shocks and more prone to food riots. This result suggests that while monasteries were extracting parts of the agricultural output through the tithes, they might not have redistributed enough of it in times of dire need, leaving the population worse off. I complement these findings by using a unique historical experiment. In November 1694, the King enforced a new temporary law to constraint abbeys without an abbot at their head to spend one third of their income in poor relief, which is equivalent to the customary amount devoted to poor relief in the religious canon. *Cetiris paribus*, the likelihood of social conflicts was lower in districts in which there was at least one abbey concerned by this law than in other districts. This set of results suggests that religious poor relief could be an efficient insurance system against negative transitory economic shocks induced by weather shocks. Religious institutions (monasteries), however, often escaped their obligations, and left local communities in worse off situations.

**Related literature.** My work relates to a large literature that studies the role of political leaders on economic and non-economic outcomes (Besley, Montalvo and Reynal-Querol, 2011; Hayo and Neumeier, 2014; Jones and Olken, 2005; Yao and Zhang, 2015). Jones and Olken (2005) were among the first to provide causal empirical evidence in favour of the hypothesis that leaders matter for economic growth. They use unexpected deaths of leaders while in office as a source of exogenous variation to show that these leadership transitions have a significant impact on countries' pattern of economic growth. Yao and Zhang (2015) use the fact that a large number of Chinese local leaders are periodically shuffled across cities to estimate their impact on local economic growth. They show that local leaders also matter. Rochlitz et al. (2015) find that high economic growth is associated with career advancement for regional leaders in China, but not in Russia. Comparing the promotion system for regional bureaucracies between the two countries, the authors argue that performance-related incentive schemes are important to achieve specific policy results.[10] In a similar fashion, Jordan, Turban and Wilse-Samson (2013) emphasise the importance of information transmission to foster good

[10] However, they underline that the combination of centralised personnel control with regional policy autonomy is less effective in achieving multiple objectives simultaneously.

(successful) practices among Chinese local leaders. Disseminating knowledge to subsequent leaders is particularly important given that leaders with higher levels of experience are found to perform better in terms of economic outcomes than their peers with less experience (Feld and Schaltegger, 2010; Moessinger, 2014). That is all the more important because evidence brought by Geys (2017) suggests that informal social networks, such as family connections, result in a misallocation of resources: dynastic individuals with lower education levels relative to their non-dynastic peers have higher chances of being selected. These could be detrimental for two reasons. First, higher levels of education among political leaders is associated with better economic performances (Besley, Montalvo and Reynal-Querol, 2011). Second, the moral hazard problem may lead dynastic politicians to reduce their effort to implement good policies and/or promote economic growth knowing that they have higher chance to stay in power (Rossi, 2017). I contribute to this literature by documenting how French provincial leaders– the intendants– could affect non-economic outcomes, such as social conflicts. I show that the effect of weather shock on conflicts was smaller in provinces administered by intendants with more years of local experience. This result suggests that the human capital endowments of local leaders was an important factor in the mitigation of weather shocks (Acemoglu, Gallego and Robinson, 2014).

My findings also provide new empirical evidence on the links between weather shocks and intergroup conflict in past societies. Jia (2014) links droughts and floods to peasant revolts in historical China, via negative income shocks. She shows that droughts raised wheat and rice prices by seven to ten per cent, which could explain how drought contributed to trigger peasant revolts. Focusing on Ancient Egypt, Chaney (2013) provides similar evidence that Nile floods led to an increase in the number of references to high food prices and in the incidence of popular unrest. These studies are complementary to recent scholarship documenting the impact of weather shocks on the onset of intergroup conflicts: in Africa (Boxell, 2017; Christian and Fenske, 2015; Papaioannou, 2016); in China (Bai and Kung, 2011; Chen, 2015; Kung and Ma, 2014; Pei and Zhang, 2014); in Europe (Anderson, Johnson and Koyama, 2017; Iyigun, Nunn and Qian, 2017); in Japan (White, 1995); and in Mexico (Dell, 2012).[11] A growing body of this literature attempts to identify factors mitigating the effects of weather shocks. For instance, Jia (2014) and Iyigun, Nunn and Qian (2017) show that the introduction of sweet

[11] Another stream of the literature focuses on the historical relationship between weather shocks and interpersonal conflict (Bignon, Caroli and Galbiati, 2017; Mehlum, Miguel and Torvik, 2006; Oster, 2004), and between various types of economic shocks and conflict (Dube and Vargas, 2013; Fenske and Kala, 2017; Jedwab, Johnson and Koyama, 2017). For a complete overview of the literature linking weather-induced and economic shocks to conflicts, see Blattman and Miguel (2010), Burke, Hsiang and Miguel (2015), Dell, Jones and Olken (2014), and Dixon (2009).

and white potatoes, respectively in China and in Europe, reduced the incidence of conflict. Chen (2015) points to the importance of government disaster relief as an efficient mitigation strategy against negative weather shocks in pre-industrial China.[12] Similarly, Greif and Iyigun (2013) show that the Old Poor Law was an efficient mitigation mechanism in 17th and 18th-century England: the higher amount of resources allocated to poor relief in a given county, the lower the number food riots per year.[13]

In this regard, my work also relates to the literature on poor relief in pre-industrial Europe. Van Bavel and Rijpma (2016) indicate that formal poor relief could have represented up to three per cent of the GDP in England and the Low Counties, and provided support to around ten per cent of the population. Levels of formalised relief were nonetheless much lower in France, approximately half a per cent of GDP, with the North much better provided for than the South.[14] Tithes may have provided additional poor relief to bring total social spending to one per cent of GDP, but the paucity of data on this question renders precise estimates difficult.[15] My contribution here is twofold. First, I provide additional evidence that weather shocks were an important determinant of social conflicts in past societies.[16] I emphasise the importance of income as a transmission mechanism between weather shocks and social conflicts.[17] As such, the effect of weather shocks on different types of social conflicts is heterogeneous, suggesting that studies that focus on aggregate measures of conflicts actually underestimate the effect of weather shocks. I also add to the stream of French historiography on the sources of popular violence and disorders in early modern France. (Bercé, 1974; Bouton, 2000; Le Roy Ladurie, 2006; Nicolas, 2002; Pillorget, 1975; Porchnev, 1963; Tilly, 1972).[18] Second, I provide empirical evidence that tithes may have not constituted an efficient system of poverty relief, because

[12] The importance of state's actions is also highlighted by Hung (2009). During the Qing Dynasty, the evolution of the state capacity shaped protesters' strategies. Moving from violent reactive actions in the 17th century, protest became proactive and more peaceful during the 18th century when the state capacity of the Qing reached its maximum.

[13] They further show that the effect is limited to social conflicts driven by economic motives. Government relief policy had either no effect or statistically positive and significant effect on the incidence of land and enclosure related social disruptions.

[14] Van Bavel and Rijpma (2016, pp. 178–9).

[15] In the Middle Ages the introduction and formalisation of the tithe offered a new form of poor relief. The tithe was intended to sustain parish priests, maintain church buildings and provide alms for the poor (Arnoux, 2010, pp. 150–1). Theoretically, from one-fourth to one-third of the tithe was meant for the poor, which would have represented £20–45 millions per year in the 18th century. See Brumont (2010) for a literature survey on tithe in early modern France.

[16] Le Roy Ladurie (1960) warns that climate determinism makes little sense in historical studies of traditional societies. In particular, Ladurie, Berchtold and Sermain (2007, p. 261) note that "the idea of a weather mono-causality of the French Revolution would be absurd. The challenge is to examine, so to speak, the ecological-climatic context, which is just one factor among many others: cultural, political, economic, demographic, etc.".

[17] For more details on the plausible mechanisms driving this relationship and a brief overview of the theoretical background, see Chambru (2019, Chap. 2).

[18] For a literature survey, see Le Roy Ladurie (1974), Lemarchand (1990), and Aubert (2015).

religious institutions escaped their obligations.

The paper proceeds as follows: Section 2 depicts the socio-economic situation of France prior to the French Revolution, and emphasises various remedies that could help to mitigate the effects of weather shocks and presents historical evidence of how they could work. Section 3 describes the data sources and the construction of the data. Section 4 presents the empirical model and the results. Section 5 concludes.

## 2 Historical background

In this section, I present a historical overview of the French economy and its vulnerabilities to weather shocks during the 17th and 18th centuries, before detailing the institutional structure of the country and the role of intendants. Finally, I discuss the organisation of state-led and religious poor relief in times of dire need.

### 2.1 The French economy before 1789

By 1789, France offered a picture of a pre-industrial society characterised by a rural economy, in which small industries, such as textiles, had begun to mushroom everywhere over its territory (Markovitch, 1976, p. 476). The total economic output remained nonetheless largely dependent on rain-fed agriculture, which involved from seventy to eighty per cent of the population, most of which lived in villages of less than or equal to 2,000 inhabitants.[19]

Agriculture was characterised by its regional heterogeneity in terms of organisation and practises.[20] Hoffman reports regional differences in the growth of factor productivity of agriculture in the 17th and 18th centuries. The Paris Basin, an open-field area where fertile land left almost no space for livestock breeding, was the fastest growing region. While it was certainly an efficient organisation to achieve high agricultural productivity, it also left many agricultural workers landless. These workers were particularly vulnerable to the quality of the harvest, on which their wages depended, and subsequent price volatility. In the south and the west, the property of the land was more equally distributed, and enclosure rather open-field dominated the agricultural landscape. The production also tended to be less market-oriented allowing the farmers to organise their production to minimise the risks of harvest shortfall (Jones, 2012).

[19] This section draws heavily on Doyle (2011), Hoffman (2000), Le Roy Ladurie (2015), and Parker (2002).

[20] Appleby (1979, p. 870) notes that "it is foolhardy to speak of 'French agriculture' when in fact there were many regional agricultural systems". See also Hufton (1983, pp. 305–10).

From the early 17th century onward, the introduction of New World crops offered new possibilities of agricultural diversification and helped to improve the resilience of the local communities (Goldstone, 2012). For instance, as early as 1603, maize was given to the needy in the hospice of Bourg-en-Bresse. Introduced in the 1660s in the southwest of France, maize was quickly integrated in the agricultural mix to reduce vulnerability to weather shocks (Frêche, 1974; Ponsot, 2005). The spread of potatoes cultivation was, by contrast, much slower. Until the early 19th century, potatoes were mostly used to feed livestock in many regions, and occasionally as filler in recipes during years of poor harvest (Morineau, 1970).[21] Although the introduction of these new crops helped to improve resilience against transitory economic shocks, it could not completely prevent harvest failures engendered by weather shocks.[22] In Vivarais, long-lasting droughts during the spring and summer of 1754 impacted 176 parishes and reduced agricultural output by an estimated £796,049. Seventeen years later, the damaged amounted to £1,568,080, and official reports highlight that both grains and "olives, potatoes, and grapes suffered a lot" (Molinier, 1985, 17–31).

Detrimental weather conditions were many, and sequences of good harvest rarely lasted more than four or five consecutive years. These conditions are the same as today, and include extended and extreme cold in winter, late spring frost and hailstorms, as well as heat stress during the spring and summer (Béaur and Chevet, 2017; Goldstone, 2012; Grenier, 1996; Le Roy Ladurie, 2006). For instance, droughts impede wheat performance at all growth stages, but are even more detrimental during grain-filling stages (May–June). Cold temperature during spring delays the flowering stage of wheat and increases vulnerability to late frost, which overall results in lower yields.[23] Other sporadic events, as detrimental to agricultural production as temperature shocks, includes hailstorms, landslides, and floods (Antoine, 2009; Lachiver, 1991; Pichard and Roucaute, 2014).[24] While individuals can adapt to altered growing

[21] On the introduction of other New World crops in France, see Nassiet (1998) for buckwheat, and Frêche (1974) for maize. On the factors driving farmers to choose such-and-such new crops, see Vouette (2007, pp. 207–42).

[22] Nunn and Qian (2011) show that, due to better nutritional qualities, higher resistance to weather variations, and higher yields than any traditional crop, the introduction of potatoes cultivation had a positive impact on population growth and urbanization in Europe. Cook (2014) contends that the impact was even stronger in regions where potatoes consumption was complemented with milk consumption.

[23] Very low temperatures during winter can reduce the number of tillers and thus lead to a reduction in crop density (yield). On the contrary, important positive temperature anomalies can result in fewer heads and reduce resistance to frost (vernalisation), which has a negative impact on yields (Ceglar et al., 2016, p. 64). Flowering time is key to adaptability and yield potential of wheat, and as such is one of the most important phenological stages in crop development (Langer, Longin and Würschum, 2014). To better control the flowering period, it is possible to adjust the sowing time in autumn. Adverse weather conditions for ploughing and planting are then linked to over-wet conditions. Rainfall plays an equally important role during the rest of the year, as heavy rains could cause nutrient leaching as well as wreak havoc on standing crops. The effect of rainfall extremes on wheat yield is, however, lower than those of temperature (Mäkinen et al., 2018, pp. 212–15).

[24] Lachiver (1991, pp. 472–528) provides numerous narrative evidence depicting these events and their consequences on local communities. Goldstone (2012, p. 201) highlights that "lacking artificial fertiliser, the output of

conditions in the long-run, coping with year-on-year environmental uncertainties and weather variations is much harder. Bad harvests drove up crops prices–to a greater or lesser extent– and most of the time, the reduction in the volume of crops available for market outweighed the gain in price, leaving farmers in precarious situations. The effect of the shock could be accentuated by the fact that farm unemployment increased due to smaller crops. In urban areas, high food prices represented a direct negative income shock for most dwellers. The problem of feeding the people loomed throughout the 17th and the 18th centuries and was a constant concern of the royal administration because these recurrent episodes of weather-induced crop failure increased poverty stress, and sometimes malnutrition, and created the ideal ground for the onset of social disorder.[25]

In these conditions, that agricultural production rose strongly from the first half of the 18th century onwards is crucially important. Surpluses could be traded to foreign provinces and/or stored to be used for poor relief later on. These improvements in agricultural productivity were widespread across French regions, though unequally distributed (Goy and Ladurie, 1982; Hoffman, 2000; Le Goff and Sutherland, 2000).[26] Urban demand and market opportunities were the main driver behind the raise in agricultural productivity.[27] However, high transportation costs and substantial fixed costs involved in storing grain surpluses and preparing them for the distant market limited the interest in grain exportation from peripheral areas (Daudin, 2010; Grantham, 2007; Hoffman, 2000). In 1770, Auguste Auget de Montyon, the intendant of Riom in Massif Central, complained that "mountains make communication so difficult that transportation costs are as high between Clermont and Aurillac as between Clermont and Paris".[28] These difficulties of transportation, as well as internal customs barriers,

crops was limited by the fertility of the soil, the beneficence of climate, and the toil that could be drawn from human and animal labour". See also Garnier and Surville (2010, pp. 272–528). Extreme cold during winter was also devastating in past societies because in addition to leading seeds to freeze in the ground, it required higher calorific intake to sustain the basal metabolic rate stable without loosing weight. It also often impeded the circulation of grains.

[25] For a theoretical overview the link between income shocks, grievances and conflicts, see Collier and Hoeffler (1998). For empirical evidence, see for instance Bazzi and Blattman (2014); Dube and Vargas (2013); Miguel and Satyanath (2011).

[26] Goy and Ladurie analyse the evolution of the tithe, a proxy for agricultural production, across several regions. They find that wheat yields improved by 20 to 40 percent between 1650 and 1790.

[27] On the supply side, cities provided large amount of fertilisers, which helped to increase the fertility of soil in the surrounding areas. On the demand side, the spatial aggregation of demand in these cities was strong enough to create an urban demand stimulus fostering agricultural investments and productivity gains (Miller, 2009). In this regard, the example of Champagne is illuminative. During the 18th century, the increasing demand from consumers in urban centres prompted changes in the vineyards of Champagne, and led winegrowers to invest heavily in new equipment, and produce higher quality white wine. By 1789, 40 per cent of the total production was bottled, whereas this practice was nearly non-existent before 1700 (Musset, 2011).

[28] Cited in Leymarie (1956, p. 301). The distance between Clermont-Ferrand and Aurillac is 156 km. The distance between Clermont-Ferrand and Paris is 423 km. Twenty years later, J.-M. Lequinio made similar statement during a speech at the National Assembly: "Sometimes wheat is abundant in the departments of the center of France while coastal departments are lacking it, in particular those of Midi. Land transportation would increase

seigneurial tolls and trade legislation, limited market integration both at the regional and the national levels. It was, therefore, common that "within a region, wheat prices could easily double from one place to another" (Labrousse, 1931, p. 131).[29] Figures 13 and 15 visually demonstrate the weak market integration in the second half of the 18th century. In Flanders (1765) and Brittany (1771), two provinces with relatively low geographical barriers and short distances between markets, variations in wheat prices were as high as 25 per cent around the provincial mean.[30] Grain prices were then very sensitive to harvest, and harvest failures were a significant part of many subsistence crises that happened in France during the 18th century.[31]

In a seminal book, Sen (1981) suggests that famines often originated in distribution (market) failure rather than in the decline of food availability per head (entitlement).[32] Ó Gráda and Chevet (2002) have studied the role of grain markets during the 1693–94 and 1709 crises. They find that, despite an apparent balkanisation of markets, there is no evidence that these famines got worse because of the poor market integration. Until the early 18th century, population pressure and major crop failures were the main drivers of famine. Only after 1710, the role of human political agency became important in some areas (Alfani and Ó Gráda, 2018). These results, however, provide no insight on how market integration could influence social conflicts, and more specifically subsistence-related conflict. Nicolas (2002) provides many examples of food riots in which those who needed food and those who commercialised it clashed over hoarded supplies, over transports on highway and river, or over excessive prices.[33] At the same time, higher levels of market integration helped to stabilise prices and to reduce the size of the income shock associated with crop failures.

so much the prices of this commodity [wheat] that it is impossible to use it. Numerous departments remain exposed to the horrors of dearth while some others remain unnecessarily endowed with abundant harvest". *Archives Parlementaires de 1787 à 1860*, Tome LIV, p. 13.

[29] Similarly, Labrousse (p. 139) notices that if "trend in prices more or less coincide [between regions], cyclical and annual variations, as well as the intensity of the long-term trends are very different". The situation persisted at least up to the 1830s when grain market was not yet integrated in France (Franck and Galord, 2017, p. 19).

[30] Other factors, such as seigneurial tolls and internal customs duties, impeded the integration of grain markets and contributed to create long lasting regional disparities in cereal prices.

[31] The situation was not fundamentally different in England up to the beginning of the 19th century Campbell and Ó Gráda (2011). For a discussion on the causal link between weather conditions and grain prices, see Grenier (1996).

[32] Defining entitlement as the "set of alternative commodity bundles, any one of which the person can decide to have' (p. 45), Sen argues that starvation occurs either through a fall in the endowment bundle, or through an unfavourable shift in the exchange entitlement mapping (that is to say "the set of alternative commodity bundles that the person can command respectively for each endowment bundle" (p. 46)). Market failure being one of this unfavourable shift.

[33] Tilly (1972) has argued that higher level of market integration led to new form of food riots around grain movements during the 18th century. I depart from her by focusing solely on the importance of transitory deprivation, but I do not contend that these structural changes in the political economy of France were not an important factor.

## 2.2 Administrative organisation and the role of intendants

Since the early 17th century, France, along with other European states, was getting more centralised, and many improvements had been made in terms of provincial administration.[34] By 1789, France was divided in 32 provinces, named *généralités*, which were themselves divided into nearly 700 districts, named *subdélégations*.[35] France was further divided between *Pays d'Élection*, *Pays d'Imposition*, and *Pays d'État*. In the latter, local Parliament persisted and remained an important political authority competing with the intendants (Beik, 2005; Bordes, 1960; Swann, 2001).[36] For instance, local Parliaments continued to annually consent to make a free gift to the Crown, and accordingly decided by themselves the allocation of taxes (*taille*) between each *élection*. The role of intendants was thus more limited in *Pays d'État*. They could only manage new taxes, such as the *capitation* (head tax) implemented in 1695 (Swann, 2001). By contrast, in *Pays d'Élection*, intendants allocated taxes on the behalf of the King between each district, and then between each parish within each district.[37]

As royal commissioners and heads of *généralité*, intendants had power in the spheres of finance, justice, and police, which means that they collected taxes, regulated trade, controlled prices, managed the construction of roads, and provided what relief existed.[38] John Law, a Scottish economist who had been Controller-General of Finances in 1720, once stated that "I never would have believed what I saw when I was Controller General of Finances. The fact is that the kingdom of France is ruled by thirty intendants. [...] They are thirty Masters of Requests assigned to the provinces on whom depend the bad or good fortune of these provinces, their abundance or their sterility".[39] There was neither civil service regulations detailing the requirements for becoming intendants, nor official examinations used to qualify them, or educational institutes to train them. Though, about two third were high ranking judicial officers prior to their first appointment, and 89 out 90 intendants studied by Gruder

[34] Johnson and Koyama (2017) provide a useful survey on the origins and the consequences of the rise of state capacity. On the organisation and the evolution of French state and administration, see Collins (2009).

[35] These *subdélégations* were composed of a various number of *élections*.

[36] In every military province, which were a different type of administrative subdivision, an officer usually chosen from the highest nobility monitored affairs related to military and diplomatic policy. There was also a fierce competition between these provincial governors and the intendants.

[37] *Pays d'Imposition* represented an intermediary situation. Local institutions remained in use, but the intendant had power in every field. The status was only granted to provinces newly conquered.

[38] In 1764, the Abbé Expilly (1763–68, Vol. 3, p. 830) defined the intendants as follow: 'Ces Intendants sont des Magistrats, pris pour l'ordinaire parmi les Maîtres des requêtes, & envoyé par le Roi dans les provinces pour y avoir l'inspection & la direction de la justice, de la police & des finances, & pour y donner ordre aux affaires extraordinaires. En un mot, dans une province, l'Intendant eft proprement l'homme du Roi, chargé de veiller à ses intérêts, & d'avoir soin de ceux du peuple.'

[39] Cited in D'Argenson (1869*a*, p. 43)

(1968) had been lawyers, suggesting they must have had a university degree in law.[40] Many of them came from a wealthy aristocratic family that could afford paying for a university degree and the purchase of the title of Master of Requests or other high-ranking offices. In addition, Gruder (1968, pp. 48–9, 97–102) reports that, throughout the 18th century, at least 70 per cent of the intendants were born in Paris or had served in Paris, and had limited knowledge of provincial affairs. Intendants constituted a relatively homogeneous group in terms of socio-economic and professional background.

Intendants were appointed directly by the King, and the position was revocable. Its holder was, therefore, completely the King's servant. On average, individuals were appointed at the age of 35, held the position two times, and each nomination lasted about 40 months (Armstrong, 1972, p. 16; Biard, 2007; Gruder, 1968, pp. 17–96). Though, exceptions existed and some intendants refused to be transferred to another position because they desired to serve tirelessly their province. For instance, Louis-Urbain Aubert de Tourny, who was born in Andelys in Normandy, held the position of intendant of Guyenne (Bordeaux) from 1743 to 1757. When they served well, they often had the opportunity to pursue their careers with appointment to high office in Paris. Thus, obtaining a position of Councilor of state (*Conseiller d'état*) was certainly a sign of prestige and promotion for intendants, in addition to be a more lucrative position.[41] The most famous example of promotion might be Anne Robert Jacques Turgot, who after being intendant of Limoges for about a decade became Controller-General of Finances in 1774 (Burley, 1981, pp. 20–2).[42]

Gruder argues that the legal training, the pattern of recruitment and promotion make certain that the majority of intendants were competent enough leaders who ruled effectively their provinces. Though, no matter how adequate the preparation of new intendants was,

[40] Between 1771 and 1789, 43 per cent of the Master of Requests were members of the Parliament of Paris and 28 per cent members of a provincial Parliament (Nicolas, 1998). During the reign of Louis XIV, 120 out of the 150 appointed intendants were Master of Requests (*Maître des Requêtes*) in the Royal Council. The position of Master of Requests was a non-hereditary venal office sold at a price of £100,000. Wealthy members of the nobility and bourgeoisie were able to buy such offices and were willing to do so because serving the Crown offered opportunities for social advancement and helped to make themselves more acceptable in the highest ranks of the social hierarchy. Kinship, family connections and social network also played an important role in one's career advancement. For a detailed discussion of the family origins and social evolution of intendants, see Gruder (1968, pp. 97-207). For more details on the creation and the evolution of the position of intendants, see Biard (2007, pp. 72–82). On the powers of intendants, see Boiron (2008, pp. 53–65).

[41] In Franche-Comté, intendants' income varied from £20,000 to £30,000, but they had to draw money from the total sum they received to pay for the administrative expenses of their province. That includes the expenses of his offices and the wages of all his subordinates, which could represent up to half of their income (Brossault, 1999, pp. 369–99; Gruder, 1968, pp. 237–40).

[42] Before that, Turgot had been Master of Requests in 1753. In 1761, he became intendant of the province of Limoges until 1774. For a general overview on intendants under the rule of Louis XIV, see Smedley-Weill (1995). Lebrun (1971) provides a useful analysis of the family background, the social network, and the careers of intendants in the province of Orléans and Tours.

transfer of skills and adaptation from their former position to the new one required some time. When they arrived in a new province, intendants had to learn about its geography, its agricultural structure, the functioning of its institutions, his network of subordinates in districts and how to deal with the local notables.[43] The learning curve of newly appointed intendants included thus both human and social capital. In his famous *De l'Administration des finances de la France* published in 1784, Jacques Necker, former Controller-General of Finances (1777–81), emphasised the role of experience for these men who were sent to govern provinces without "any other preparation than their having launched out into the polite amusements of the metropolis [Paris]". He further insisted that:

> "It were much to be wished that the magistrates who are appointed to be Intendants were to remain much longer residents in the same provinces : knowledge is in all things the work of time, and it is a renunciation of a valuable advantage to forego that which is given by experience. I own that an intendant, though translated from one province to another, does lose the knowledge that results from general researches : but all the information that are peculiar to places, and circumstance, are thereby lost, and the improvement that were begun, are suspended either through the inexperience, or the pride of his successor."[44]

In this regard, the transmission of experience from former intendants and the reliance on the network of subordinates in districts were very important for newly appointed intendants.[45] To facilitate such transmission, intendants sometimes wrote detailed instructions about the

[43] That was particularly important to avoid serious setback short after one's arrival in a new province. Thus, François Richer d'Aube had been intendant of Caen between 1721 and 1727, before being appointed as intendant of Soissons. He was known for being inflexible, hard working, rigorous, and performing his duties better than anyone else once a task was given to him. Both in Caen and Soissons, he had been willing to modify the repartition of the head tax to reduce arbitrariness. Something for which, he had to face the fierce opposition of local elite. That finally cost him his position, and he got dismissed in 1731 (D'Argenson, 1869*a*, pp. 81–2). Similarly, in 1710, Marc-Antoine Bosc du Bouchet was sent to Limoges to manage the shortage of grain. He took his tasks to heart, and sought to alleviate food shortages by asking wealthy citizens a financial contribution. Some of them refused, and he decided, among other things, to fined them. Many complaints about the behaviour of the intendant arrived on the desk of the Controller-General of Finances in Paris. In May 1710, the Controller-General of Finances reminded him that "the king pardons nothing less, in those to whom he has chosen to confide his authority, than the abuse they do by excessive actions when they get carried away, giving in fully to their mood and their natural vivacity, excited by a misplaced zeal". Bosc du Bouchet was finally dismissed in December 1710 (Boiron, 2008, pp. 50–61).

[44] Bibliothèque nationale de France (hereafter BnF), IFN-8613398, De l'Administration des finances de la France, Volume III, pages 383–4. The translation is from the English translation by Thomas Mortimer (1786), *A Treatise on the Administration of the Finances of France in Three Volumes*.

[45] Glineur (2013) provides a modern transcription of such instructions for the province of Flanders in 1683. On the relationship between the intendants and the *subdélégués*, see Barbiche (2012, pp. 383–406), Brossault (1999, pp. 215–75), and Cerisier (1995). On the socio-economic background and careers of the *subdélégués*, see Brossault (1999, pp. 63–109).

history, the administrative organisation, the state of the economy, and the current affairs in their province. Direct transmission was also possible, and in 1683, the Secretary State of War wrote to Michel Le Peletier de Souzy to enjoin him to "stay after the arrival of M. de Breteuil [his successor as intendant of Flanders] to provide him with the explanations, which he will need so that he know about the state of the affairs in which you are involved".[46]

Food supplies was at the top of intendants' priority list, and they had to continuously monitor the stock of available grains, evaluate the prospects of the current harvest, built up emergency granary supplies, make price-fixing arrangements, regulate the trade of grains, and sometimes develop international links for grain supply (Frêche, 1974, pp. 805–13). Intendants and other officials had to find a balance between public and private undertakings, as well as between amassing supplies in advance and waiting for shortages to avoid the troubling beliefs that the administration was hoarding grains to harm the populace.[47] Such actions required a deep knowledge of the local social actors, and Miller (1999) argues that intendants gained increasing skill in organising emergency supplies and managing grain and bread markets over the course of the 18th century.[48] Additionally, intendants had broad power in fiscal-related questions. They could grant tax breaks and exemptions, for instance to favour the clearing of land for farming or to relieve population from the fiscal burden after the occurrence of natural disasters. There was, nonetheless, no formal rule, and exemption decisions as well as disaster indemnification were discretionary (Antoine, 2009; Bordes, 1962; Favier, 2007).[49] In times of dire need, the role of intendants was thus fundamental. By implementing efficient policies in the fiscal and grain supply-related spheres, they could help the local population to better cope with transitory economic shocks, and reduce the likelihood that the local population resorted to social conflicts.[50] But the implementation of these policies required a high level of province-specific human and social capital gained through experience.

[46] Cited in (Glineur, 2013, p. 101)

[47] BnF, Ms. fr. 21812. Mémoire concernant Mrs les Intendans, départis dans les différentes provinces et généralités du royaume fait par M. D'Aube, maître des requestes, en l'année 1738. See pages 493–521.

[48] For more details regarding intendant's action in the field of legal enforcement, see Root (1992); in the field of justice, see Hamscher (2012).

[49] Boiron (2008, pp. 103–8) provides an overview of tax breaks granted to districts in the province of Limoges between 1684 and 1715. In 1693 and 1694, about £320,200 were granted in tax breaks, that is about 15 per cent of the initial total taxation (pp. 331–2).

[50] Intendants could use tax funds set aside on the head tax (*capitation*) for charity purposes, and granted taxes break or exemption depending on the circumstances. After the break out of large events, such as famine, plagues, fire, and floods, the central government also played a role in the mitigation of crisis. McCloy (1946) shows that during the 18th century, small sums were often voted to support poor relief in affected areas.

### 2.3 Assistance, poor relief and absorption of weather shocks

In September 1746, Louis Tourny, then intendant of Bordeaux, called upon the Controller-General of Finances in Paris to initiate imports of large quantity of grains to reduce the risks of scarcity from the winter onward. To support his request, Tourny insisted on his past experience. He recalled in his letter that, back in September 1738, he also forecasted that grains would miss. Repeated wet summers had led to harvest failures all over western France, and prices of wheat skyrocketed in autumn 1738 (Bricourt, Lachiver and Queruel, 1974, pp. 284–8). In Périgeux, the price of wheat had increased by 36 per cent compared to the 1727–37 average. In Angoulême and Limoges, prices rose by 49 and 71 per cent, respectively.[51] Tourny rapidly understood the risks of the situation. He wrote to the Controller-General of Finances to request for very large supplies of grains to become available by using the King's funds in order to mitigate the harvest failures.[52] In the end, the shortage was limited and only two food riots occurred in his province in 1738–9.[54]

Back in summer 1773 in the province of Languedoc, the intendant de Guignard de Saint-Priest also efficiently dealt with the lack of grains. After writing to the Controller-General of Finances to inform him about the situation, Emmanuel de Guignard de Saint-Priest requested his *subdélégué* in Montpellier to provide him with a detailed overview of the amount of grains needed by impoverished households to crop their fields and to survive until the next harvest. To illustrate how such investigations were carried out by the second half the 18th century, I provide a summary per parish of the document he received on 27 August 1773 (Table 1).[55] He forwarded the document to the Controller-General of Finances who could then "ask for a financial arrangement to the King [...] to supply them [the poor] with grains for both their subsistence and their seeds".[56] Despite the initial shortage of grains, there was neither a food

[51] Bussière (1877, pp. 184–90), Duffaud (1861, pp. 309–21) and Georges (1920, pp. 75–6).

[52] "In 1738, I was [intendant] in Limousin, and I forecasted, in the very same month [September], that the généralité would be exposed to an extreme scarcity of grains in the following winter, and up to the next harvest. As such, I asked M. Orry [Controller-General of Finances] to make very large supplies of grains by using King's funds. Without this precaution, many would have died from starvation. In the end, people suffered a little, and the accounts suggest that revenues exceeded expenses. [...] I am only telling you these facts so that you know what will happen under my administration in such circumstances".[53] For more details on the management of grains supplies under the rule of Tourny, see pages 203–20.

[54] In May 1739, a crowd gathered in Ruffec to protest the high price and scarcity of bread (D'Argenson, 1869*b*, p. 159). Few months later, on 22 July, a similar event happened in Angoulême but with no further aftershocks (Bujeaud, 1860, p. 320).

[55] This kind of documents are not rare in the archives, and many more can be found for earlier periods. See for instance, A.D. Eure, 13B 501 – 13B 502, Bailliage de Pont-Audemer : Enregistrement des déclarations des grains et récoltes en 1709. A.D. Calvados, 2B 527, Déclarations passées devant le lieutenant général par les propriétaires et fermiers du produit de leurs récoltes en 1709.

[56] In a companion letter, the *subdélégué* provided detailed information on the way he compiled the overview:

"We focus only the poor without any resources or assets. We exclude individuals that seemed able to find

riot nor a spike in mortality rates in theses parishes in 1773–4.

During the 18th century, intendants often sought and obtained support from the central government to alleviate local disasters, be it in the form of a reduction in taxes, a dispatch of food supplies, or a monetary grant.[57] When they failed to forward information on the state of the harvest and wheat prices in their province to the Controller-General of Finances, it was not rare they received a remonstrance in the following weeks.[58] The action of municipal authorities could complement these efforts, but in many cases, towns and parishes had either limited financial resources or none to do so (Hufton, 1974, pp. 137–76, 369–84; Miller, 1992).[59] Van Bavel and Rijpma emphasise that the Clergy could constitute a significant source of relief in times of dire need. Indeed, the Church were not only tithe owner but also an important landowner, which means that it controlled some of the largest stocks of grains in France. The resources of parish priests were nonetheless limited and insufficient to assuage the needs of the poor. Most of the religious charity was, therefore, dependent on abbeys and monastic houses, whose wealth varied considerably across regions (Hufton, 1974, pp. 197–201). As a centre of consumption and expenditure, monasteries could have positive spillovers on the surroundings areas, be it through almsgiving, the provision of employment and education, and/or medical services. For instance, Mannix (2018) argues that ecclesiastical proprietors reinvested more of their agricultural rents than secular landlords allowing their tenants to build up capital and increase agricultural productivity of their lands.[60]

The tithe was a tax paid to the Church based on a proportion of the crops farmers produced–usually around 10 per cent. In principle, it was supposed to provide for parish priests, charity and the maintenance of Church buildings. As such, it could be considered as a social insurance system to provide for the needs of the impoverished in times of crises. Religious institutions supported the cost of storing grains over long period and redistributed it under the forms of alms when needed, in exchange of what they were allowed to take part of it to provide

support by themselves through their possessions. We include all poor, but we diminish nonetheless the relief needed for their survival in proportion of what they would be able to get by the work of their hands. [...] The more we investigated the damaged caused by the hailstorm, the more we are convinced [...], that it is impossible to require in the first community [Gigean] the recovery of taxes, and in other communities it is only possible to recover taxes diminished proportionally to the damages caused to their harvest". A.D. Hérault, C 5458.

[57] For more details and examples of crises management, see Balso (1993), Boiron (2008, pp. 311-378), Cathelineau (1912, pp. IX–X), Chapalalain-Nougaret (1984, pp. 141–55), and Hufton (1974, pp. 177–93).

[58] "Il est essentiel que je reçoive ces Etats au plus tard dix jours après chaque quinzaine, [...] ainsi je vous prie de vouloir bien recommander aux Subdélégués de ne plus négliger de satisfaire à un envoy avec la plus grande exactitude." A.D. Somme, 1C 77.

[59] For more details on the management of local hospitals and *dépôts de mendicité*, see Hickey (1997) and Legay (2013), respectively.

[60] On the economic role of monasteries in 18th-century France, see McManners (1998, pp. 507–70), and Goudot (2006). For a general overview of the political, economic and social roles of monasteries, see Beales (2003, pp. 84–111).

for their own needs.[61] On the other side, in many provinces, the tithe equalled royal direct taxes and added to the fiscal burden on peasants shoulders, which could be very detrimental if redistribution did not happen (Collins, 2009, pp. 233–5; Lefebvre, 1972, pp. 104–17).

The historical literature provides many evidences of the sporadic nature of monastic charity and the reluctance of these institutions to provide assistance to the poor.[62] Wealthiest abbeys had an annual income of several tens of thousands of *Livres*, 30–45 per cent of which was derived from the tithe.[63] In some cases, the share of the tithe could be much higher, as high as 80 per cent of the total income of religious institutions in the archdiocese of Auch (Rives, 1976, pp. 21–8). A large share of this income, however, was spent on the mense of abbots and bishops, and charity often represented 10 per cent or less of the total spendings.[64] This is particularly true for abbeys *in commendam* in which commendatory abbots and abbesses usually exercised no authority over the inner monastic discipline, but filched a significant share of the monastic income. By late 18th-century, there were about 1,000 abbeys *in commendam*, many of which were given an abbot from a great aristocratic family who was living far away from the monastery (Hoffman, 2006, pp. 73–4).[65]

The cathedral chapter of Saint-Maurice in Angers had an annual income of £140,000 by the end of the 18th century, of which £43,000 was derived from the tithe. On average, the canons distributed to 35 parishes a total of £262 in the 1770s and £1,004 in the 1780s (Michel, 1979, pp. 587–95).[66] In Paris, charity amounted to 1.3 per cent of the total expenditure of the cathedral chapter of Notre-Dame between 1759 and 1789 (Mannix, 2018, p. 76). Rives (1976, pp. 115–9) reports that, in 1783, charitable expenditure amounted to eight per cent of the income of the archbishop of Auch, and to three per cent of the income of the cathedral chapter of Sainte-Orens. By the end of the 17th century, several rulings of the Council of State

[61] Considering the tithe as an insurance mechanisms does not diminish its drawbacks: the tax base was limited to agricultural production and excluded all income generated in urban areas (redistributive effect); it was collected from the fields and did not take into account the fact that some of the grains had to be kept for seeds; its collection cost was usually high (Marion, 1974, pp. 122–4).

[62] See Hufton (1974, pp. 133–7) and Hufton (1983, p. 310).

[63] Apart for the most important abbeys, the tithe came from land owned in the surroundings of the abbeys, usually a few dozen kilometres away at the most (El Kordi, 1970, pp. 42–6; Goudot, 2006, p. 12–4; Lemarchand, 1965, pp. 532–3; Michel, 1979, pp. 586–7). For instance, in Normandy, the Abbey of Le Bec had an annual income of roughly £60,000 in 1780, half of which was derived from the tithe (Davranches, 1897, p. 10). BnF, 8-LAG-75, Almanach Royal, année bissextile 1780, présenté à Sa Majesté pour la première fois en 1699.

[64] The situation in England was the same. About 10 per cent of total expenditure went to monastic charity and alms around the 16th century (Dyer, 2012, p. 47).

[65] See also McManners (1960, pp. 74–102), and McManners (1998, pp. 492–504). Most of the income annexed by commendatory abbots was spent far away from parishes it was raised, which was a source of grievances among local population and blistering criticism from Young (1906, p. 92). This is also true for bishops and archbishops who also received a significant share of the tithes (Rives, 1976, pp. 63–114).

[66] In Anjou, parish priests received at most between 20 and 30 per cent of the tithe. Similar rates were observed in Normandy (Lemarchand, 1989, pp. 333–6).

had reminded abbeys that Church revenue should be divided into three parts, one of which is devoted to the poor, suggesting that it was not usually the case.[67] That made ordinary clergy and peasants extremely resentful of the tithe.[68] For instance, the priest of Ecretteville-les-Baons reported in 1729 that "the abbot of Fécamp provides very little relief to the poor".[69] Few decades later, a local priest complained to the bishop of Rouen that "the abbot of Saint-Wandrille [in Normandy] owns two thirds of the tithe, and yet he never comes to help the poor in my parish".[70] To the best of my knowledge, no research has attempted to study the relationship between the tithes, monastic charity and social conflicts in early modern Europe.

## 3 Data

My difference-in-difference empirical strategy compares the likelihood of social conflicts in districts exposed to weather shocks versus those which were not, across provinces with various years of local experience embedded in intendants. I conduct my analysis at the level of districts, which corresponded to second-level administrative division. By 1789, France was divided into 690 districts (*subdélégations*) scattered across 32 provinces (*généralités*). These administrative units were relatively stable over the 17th and the 18th century, but some changed boundaries and were created and extinguished over time.[71] To circumvent this issue, I aggregate and/or crop all my data to districts boundaries in 1789 to obtain a consistent data set from 1661 to 1789.[72] To do so, I digitised and georeferenced a map of French administrative limits at the district level (*subdélégations*) circa 1789 (Arbellot et al., 1986).[73] I match this map

[67] BnF, Département Droit, économie, politique, F-21049 (127). Arrêt du conseil d'état en interprétation de ceux des 17 juillet et 20 novembre 1694 concernant les revenus des abbayes vacantes. Acte. 1695-04-04, Versailles. See also Bligny-Bondurand (1908, p. 519).

[68] They often blamed some abbeys, as well as grain merchants and local seigniors, for hoarding grains and speculating on prices. For more details on the famine plot syndrome, see Kaplan (1982).

[69] A.D. Seine-et-Marne, G 5560 (cited in Lemarchand, 1989, p. 179).

[70] A.D. Seine-Maritime, G 841 – G 846 (cited in Beaurepaire, 1889, p. 85). In Lempzours in the Périgord region, peasants complained in the *cahier de doléance* written for the Estate General of 1789 that: « Les revenus de l'église, dans chaque paroisse, sont occupés en grande partie par des abbés, des prieurs commandataires et autres, qui dépensent tranquillement leurs revenus à Paris ou dans des villes, sans penser aux pauvres des paroisses dton il retirent le revenu. Veut-on que des congruiste, qui n'ont pas l'unique nécessaire pour vivre, et souvent pas assez, fournissent à l'indigent, sur son grabat, des secours qui souvent ne sont pas en leur pouvoir d'accorder ? » (Bussière, 1885, p. 122). For more examples, see Beaurepaire (1889, pp. 81–5), Bligny-Bondurand (1908, p. 176, 233, 247), Bricourt, Lachiver and Queruel (1974, p. 290), Cathelineau (1912, p. 182, 249, 350), and Gricourt (1963, p. 483). For an overall review of the resent of peasants against taxation and tithe, see Markoff (1990). On the mismatch between the initial principle of the tithe and its usage, see Marion (1974, pp. 160–72).

[71] Didier (2014) provides an in-depth analysis of the evolution of districts boundaries for the province of Brittany.

[72] I exclude all areas that were not part of the French territory by 1789. So, for instance, the Comtat Venaissin, which nowadays constitutes the Vaucluse department, was a part of the Papal States until September 1791 and is excluded from all my regression. I further exclude Corsica, annexed in 1768, because of the low reliability of the existing data for the 18th century.

[73] The map is composed of 12 sheets at a scale of 1:500,000, and based on various historical sources. For a discussion of the reliability of the map, see Lepetit (1988) and Vovelle (1986).

with various historical maps to gather information on the trade regime (*Cinq Grosses Fermes*), the level of taxation (*Gabelle*), the date of annexation, and crop rotations at the district level. The final sample is a balanced panel of 690 districts, from winter 1661 to winter 1789, with districts borders held constant at 1789 definitions. In Table 2, I provide descriptive statistics at the district level for the main dependent and independent variables used in my empirical analysis. The respective data sources are discussed in the following sections.

### 3.1 Conflict data

I build on the work of Nicolas (2002) to assemble a data set that encompasses 7,943 episodes of social conflict (*émotions populaires*) that happened within the 1789 French borders between January 1661 and March 1789.[74] Each observation in the data set corresponds to an event involving at least four individuals, from more than one single family, and deploying a verbal or physical violence against property, persons or authorities. Observation contains information on the type of conflict, the date, the place, and sometimes on the duration, the actors involved, and the level of repression used by authorities (Nicolas, 2002, pp. 835–42).[75] The definition used to assemble the data set is based on the French jurisprudence regarding rebellion during the 18th century. An ordinance from 9 January 1673 forbade to any person to gather and outrage before and in the surrounding of public places. Few decades later, *déclarations* from 30 January 1717 and 12 July 1723 stated that soldiers, vagabonds, and individuals gathered in groups of five or more, bearing weapons and opposing violently to custom and justice officers will be punished by a death sentence.[76]

I link each observation to its present-day location to add geographic coordinates and to match it with its corresponding district.[77] I construct a dummy variable, denoted *Social conflict*,

[74] Joseph-Nicolas Guyot (pp. 438–443) provides a lengthy description on what constitutes an *émotion populaire* in legal terms. BnF, NUMM-426186. Répertoire universel et raisonné de jurisprudence civile, criminelle, canonique et bénéficiale. Tome 22. Paris : Panckoucke, 1778.

[75] Information on the numbers of participants is sometimes reported in the chronicles and the administrative correspondence, but the depiction is often qualitative. For a discussion of what constituted a popular revolt as opposed to actions to be taken isolated individuals or families against outsiders, see Cohn (2009, pp. 5–13). On the challenges raised by the typologies of revolt, see Cohn (2009, pp. 76–107).

[76] BnF, NUMM-5834346. Encyclopédie méthodique. Jurisprudence. Tome 1. Paris : Panckoucke, 1782. See page 548. See also Cameron (1981, p. 219).

[77] Using automatic georeferencing procedure, such as the global gazetteer Geonames, accessible at www.geonames.org, yields very unsatisfying (inaccurate) results. Indeed, many towns and cities have merged, amalgamated or split over the last two centuries, and many more had their spelling changed. That make them hardly recognisable by automatic georeferencing procedure. In addition, some place names were pretty common and shared by tens of towns. For instance, there are 12 towns of Saint-Martin, and 222 more towns have their names beginning by Saint-Martin. Beaumont may refer to 11 different towns and is the root of 38 additional place names. Therefore, I rely on the following sources to link historical and present day names: the Cassini website (http://cassini.ehess.fr), Expilly (1763–68), and Saugrain (1726).

equal to one if at least one conflict occurred in district $i$ during season $s$ of year $t$, and zero otherwise. Using the information about the type of conflicts, classify each observation in four sub-categories: (i) subsistence-related conflicts, (ii) protests against the fiscal regime, (iii) protests against the judicial, military or police authority, and (iv) other types of conflicts. For instance, subsistence-related conflicts include events related to protests against food prices and scarcity, and the grabbing or the exports of grains.[78] I construct a set of dummy variables for each of the four sub-categories. Overall, there is at least one social conflict in 6,601 district-season pairs, which represents 1.8 per cent of the total number of observations (Table 2).

Most of these events were minor disturbances spatially limited to a set of parishes or a town, and often lasted for less than half a day, making immediate government repression impossible.[79] Before 1789, any non-authorised assemblies of four or more people were forbidden by the French central government (Cameron, 1981). In time of crisis, this number could be even reduced to reduce the risk of social disorder. For instance, the intendant of Picardy, Louis de Bernage, published an ordinance on 16 April 1709 which forbade "peasants and other individuals to gather in the countryside and village in groups larger than two after the sunset". The culprits will be sent to the galleys if the are armed, and imprisoned otherwise.[80] Each observation in the data set corresponds to an event involving at least four individuals, from more than one single family, and deploying a verbal or physical violence against property, persons or authorities.[81] This definition implies that at least some part of the local community was involved in the episode of popular disorder, and, *de facto*, excludes isolated acts of robbery, theft and/or violence (interpersonal crime).[82]

[78] (ii) includes opposition to new taxes, refusals of paying tariffs, and events related to the smuggling of tobacco and salt. (iii) refers to events such as protestation against public execution, opposition to the enlistment of recruits, attempt to free prisoners, and open hostility to *Marchaussée* and other military troops. (iv) encompasses conflict related to state reforms, noble privileges, seigniorial authority, municipal authorities, labour, and regional particularities.

[79] The *Maréchaussée* was a corps of completely mounted constabulary. It should be noted that its force never exceeded 3,000 men, and could hardly patrolled constantly a territory as big as France. In addition, there was no efficient way to quickly spread information, so by the time intendants and the *Maréchaussée* learned about a riot, a day or two could have passed and the disorder was already finished. Beik (2015, p. 47) reports that, for the entire 17th century, at most 40 to 50 urban revolts lasted more than a day. Between 1661 and 1789, about 76 per cent of the disorders lasted for less than half a day (sample of 4,140 conflicts). In the days following a riot, one of the main task of the *Maréchaussée* was to carry investigations, identify the leaders, and bring them to justice (Aubert, 2015, pp. 187–94). Only in large cities, the situation was different as local police force could rapidly quell popular disorders. In smaller towns, local priests and constables played an important role. Although it is hard to identify clearly their actions during conflicts, they usually helped to calm the people.

[80] A.D. Somme, 1C 29.

[81] It is noteworthy that political uprisings were not referenced. Nicolas was interested in conflict originating from the lower end of the social system, and, therefore, excluded political uprisings, which origins were more disputable.

[82] Hence, this definition is close to the coding strategy adopted by Hendrix and Salehyan (2012) to develop the Armed Conflict Location & Event Data Project (ACLED). http://www.acleddata.com/.

Given the timespan and the geographical scope of the data set, it is plausible that the data set suffers from a reporting bias. Social conflicts could have been persistently under-reported in some districts, either because it was too insignificant to be noticed or because the administration was unwilling to do so. To address this concern, Nicolas (2002) gathers information from a wide range of archives including judicial records, police archives, church and government records, administrative correspondences, personal diaries, local history books, and the like, reducing the likelihood that some events were consistently under-reported. To further deal with this concern, I create a sub-sample of the data set in which I only include events for which the crowd is reported to be larger than 50 individuals. Being larger, these disorders are less likely to be under-reported by the administration or to remain unnoticed by contemporaries. In addition, recent research on Normandy suggests that, although some social conflicts are missing in the study carried by Nicolas, there is neither a spatial nor a time bias in the data set (Maneuvrier-Hervieu, 2015*a*,*b*).[83]

Perceived shortages of food, be it staple crops, or bread led to many conflicts aimed specifically at preventing the departure of grains to other markets, and obtaining cheaper prices or sometimes at fixing a *just price*. The food riot that occurred on 22 August 1763 in the town of Montesquieu in Languedoc is a typical example. On market day, when the knight Desens overbid a local buyer by 5 *sols* for acquiring two *setiers* of wheat, the crowd assaulted him and chased him out of the market place. Desens was forced to take refuge in a neighbouring house until the local constables could calm the crowd down. In the subsequent weeks, the trade of grains plummeted as no merchants dared buying wheat to export it.[84] On 17 September, the intendant congratulated its subordinate for quickly spreading the information to the *Maréchaussée*, which could quell the agitation, discover the perpetrators of the riot and punish them severely.[85] Beik (2015, p. 49) describes these riots as "usually semi-spontaneous, loosely organised movements with simple grievances".

### 3.2 Independent variables

**Temperature data.** Recent research suggests that single climate variables, such as temperature or precipitation, often do as well as more complex models in predicting the effects of

[83] Bouton (2000) also investigates the occurrence of food riots in early modern France. She lists 1,265 food riots between 1661 and April 1789, and then 1,012 additional food riots until 30 June 1793. In comparison, Nicolas identified 1,497 subsistence-related conflicts between 1661 and 14 July 1789.
[84] A.D. Hérault, C 5424, pièces 97–103.
[85] A.D. Hérault, C 5424, pièces 144–5.

weather on crop growth.[86] In addition, recent findings in the literature suggest that the effect of year-on-year variations in temperature on the frequency of conflicts is larger than those of precipitation (Carleton and Hsiang, 2016; Hsiang, Burke and Miguel, 2013). Therefore, I restrict my attention to temperature in all my empirical analyses.[87]

The European Seasonal Temperature and Precipitation Reconstruction (ESTPR) data set gathers seasonal time resolution data for the last 500 years at a grid resolution of $0.5° \times 0.5°$longitude/latitude (Luterbacher et al., 2004; Pauling et al., 2006).[88] Reconstructions are based on instrumental measure for later years, and documentary historical evidence as well as several climates proxies, including tree ring and ice core series, for earlier years.[89] I use the map I digitised to aggregate these weather data to the district-season-year level. To do so, I weight each grid value that intersects a polygon (district) by its relative share in the total area of the given polygon. I then calculate the weighted mean seasonal temperature and precipitation for each set of district $i$, season $s$, and year t. Finally, I calculate the seasonal standardised temperature deviation from the long-term mean (1500–1600) for each of the 690 districts:

$$Temperature_{ist} = \frac{T_{ist} - \overline{T}_{is}}{SD(\overline{T}_{is})}$$

where $T_{ist}$ is the value of the seasonal temperature in district $i$ during season $s$ of year $t$. $\overline{T}_{is}$ is the long-term mean (1500–1600) of the seasonal temperature in district $i$, and $SD(\overline{T}_{is})$ is the standard deviation of the long-term mean of the seasonal temperature in district $i$. I denote this variable *Temperature*. A positive (negative) value indicates an abnormally warm (cold) temperature in district $i$ compared to the long-term seasonal mean.[90] Figures 1 and 3 respectively show the distribution of seasonal long-term temperature means (1500–1600), and the distribution of the *Temperature* variable for each season.

One concern is that these reconstructed weather series present systematic distortions due

[86] Although the effect of temperature conditions on inter-annual crop yield variability varies across French regions, they kept overall a substantial influence on winter wheat yields (Ben-Ari et al., 2016).

[87] Failing to include precipitation could lead to omitted variable bias in my empirical estimates (Dell, Jones and Olken, 2014, p. 742). In Section 4.1, I show results suggesting that my baseline estimate is unbiased.

[88] Roughly 2,027 square kilometres at the latitude of Paris.

[89] There are plenty of documentary accounts of past weather conditions in European archives that can shed light on both how climate changed over the past 500 years. These include scientific writings, weather diaries, annals, and parish records. These provide information, for instance, on harvest dates, phenological phenomena, droughts, flooding and freezing of rivers, warm and cold spells, wind direction and the like. These data are calibrated against overlapping contemporary instrumental records, and convert into quantitative climate data. For a discussion of climate reconstruction using documentary evidence, see Pfister, Brázdil and Glaser (1999).

[90] In Section 4.1, I present results from alternative specifications using different measurement temperature shocks, including deviation from the long-term median, deviation from the 25 year moving average, and temperature level.

to a spatial bias and/or measurement errors.[91] To test the reliability of temperature and precipitation reconstructions in France (paleoclimatological sample), I use temperature and precipitation historical data compiled from instrumental observations in various French cities between 1650 and 1800.[92] In total, I collect over 1,200 monthly observations on temperature and 7,000 monthly observations on precipitation (instrumental sample). For each series, I calculate the seasonal mean temperature (°C) and the seasonal total precipitation (mm) to compare them with the paleoclimatological reconstructions. Figure 5 and 6 respectively show the correlation between the temperature and precipitation series (r = 0.96 and r = 0.45, respectively). Overall, there is strong correlation between the paleoclimatological and instrumental samples. I further compare summer temperature reconstruction to grape harvest date (GHD). GHD are tightly related to summer temperatures. On average, the variation of GHD is approximately 10 days for 1°C variation of the temperature (Krieger, Lohmann and Laepple, 2011; Labbé et al., 2019). Figure 7 displays the correlation between the paleoclimatological sample and several series of GHD derived from Daux et al. (2012). Between 1600 and 1800 the Pearson correlation coefficient between the two set of data is high (r = -0.53) and consistent with previous findings in the literature. Overall, these analyses suggest that temperature and precipitation reconstructions are reliable proxies for weather conditions in the past.

**Intendants data.** Measuring leaders' performance in early modern Europe is challenging, and to the best of my knowledge, there is no available data set at the sub-national level to investigate this issue. To circumvent that issue, I draw upon a variety of historical and secondary sources to create a comprehensive data set of of French provincial intendants between 1661 and 1789.[93] The data set include 316 individuals who have been appointed to 554 different positions. For each intendant, I gather additional information about the duration and the location of their past and current tenure. I construct two proxies of experience.

[91] For instance, temperature and precipitation reconstructions derived from tree rings can be subject to measurement errors if the age structure of the samples of trees varies over time (Daux, 2013, pp. 14–5).

[92] Jourdain et al. (2015) provide a discussion of the early instrumental records available in France. I do not include series from Paris because they were used by Luterbacher et al. (2004) and Pauling et al. (2006) in their reconstructions.

[93] Sources for each province are: Aix-en-Provence: BnF, NUMM-5772450, Notice sur l'intendance de Provence (pp. 42–66); for Alençon: Bibliothèque Municipale de Lyon, SJ AD 251/97 T. 02, Mémoires historiques sur la ville d'Alençon et sur ses Seigneurs (pp. 449–59); Amiens: BnF, NUMM-5831631, Les intendants de la généralité d'Amiens (Picardie et Artois) (pp. 90–216); for Bretagne: Ouellet (2014, p. 49); for Dauphiné: Esmonin (1964, pp. 71–112); for Franche-Comté: Brossault (1999); for Limoges: Boiron (2008, pp. 39–52); for Orléans: Lebrun (1971); for Tours: Ouellet (2014, p. 49) and Lebrun (1971). For all other provinces: Boyer de Sainte-Suzanne (1865, pp. 35–108); Viton de Saint-Allais (1813, pp. 129–212); A.D. Isère, 6 J 137 – 6 J 188, Collection Edmond Esmonin; BnF, NUMM-94415, Le personnel administratif sous l'ancien régime; BnF, NUMP-804, Almanach Royal, année MDCCX, année MDCCXX, année MDCCL, année MDCCLXXX.

First, I calculate their local experience in province $j$ as the number of years spent since their appointment. Second, I calculate their total prior experience as the sum of the number of years spent in all their previous tenures.

Table 2 reports descriptive statistics for a set of intendant and province-level characteristics. Half of the intendants had only one tenure, and 20 per cent served for three tenures or more. Intendants served on average 6 years and 6 months, and half of them held the position for less than five years. In Section 2.2, I contend that local experience was an important determinant of intendants' ability to manage well their province, in particular in time of crisis. Figure 8 to Figure 11 motivate the analysis by providing descriptive evidence that the level of local experience of intendants varied over time and space.

**Abbeys data.** In Section 2.3, I make the case that the tithes could be either an efficient insurance mechanism against weather shocks or a mere resource extraction process if religious institutions evaded their duties. The overall effect of monastic taxation and charity in the mitigation of weather-induced poverty shocks is therefore unclear. A few tithes series exist and have been published (e.g. Goy and Ladurie, 1982), but are far from sufficient to cover the entire French territory for two centuries. To circumvent this issue, I make use of total abbeys' income which is more readily available. One flaw of using total income is that it does not capture variations in tithes shares in total income across abbeys. Total income remains nonetheless a good proxy of tithes income and potential charity effort given the importance of the former in abbeys' income.

To test if districts with higher level of resources taxation by religious institutions are better or less able to cope with weather shocks, I use historical sources to assemble data on total income of abbeys *in commendam* in 1750, 1780 and 1788.[94] I aggregate abbeys annual income at the level of dioceses, of which there were 142. I combine these data with population data at the level of dioceses for 1793, and calculate the average income per capita withdrawn by abbeys. Overall, I collect income data for 966 abbeys, which had a total income of £9,481,970 in 1780. By comparison, Expilly (1763–68, Vol. 1, pp. 2–3) reports that circa 1760 there was about 900 abbeys, which total income amounted to £9,823,100. Figure 22 shows that there is a high correlation between abbeys' income in 1750 and 1788.[95] Hence, I can cautiously extrapolate

[94] BnF, NUMP-804, Almanach royal année M. DCC. L., année M. DCC. LXXX., année M. DCC. LXXXVIII.

[95] The correlation coefficient is equal to 0.92. Correlation between income in 1750 and income in 1780 is equal to 0.89. Comparison with data from the late 17th century yields similar results. In the diocese of Rouen, the Abbey of Beaubec had an income of £14,000 c. 1698 and £20,000 in 1788; Abbey of Bellozane: £4,000 and £3,500 respectively; Abbey of Fécamp: £80,000 and £80,000 respectively; Abbey of Jumièges: £40,000 and £40,000 respectively; Abbey of Saint-Lô: £7,000 and £8,000 respectively; Abbey of Saint-Wandrille: £40,000 and £60,000

abbeys' annual income for the 17th and the 18th centuries from my sample years 1750, 1780 and 1788.

**Prices data.** In his study of price movements during the 18th century, Labrousse (1933, pp. 106–13) compiles series of wheat prices from 1756 to 1789 for each French province. I collect these data (hereafter Labrousse's sample) and convert wheat prices in grams of silver per litre before matching them with their respective province. Figure 16 to Figure 18 show the level of wheat prices at various dates. The price of wheat varied considerably across provinces. It suggests that national market integration was still quite low by late 18th century, leaving the poorest households more vulnerable to high food prices in years of acute grain scarcity.

One of the caveat of the Labrousse's sample is that Labrousse used only one series of prices per province. Therefore, it is impossible to measure the level of within-province price variations using this sample. Because market integration was low, within-province price variations could be high. To circumvent this issue, I collect another sample of wheat prices on 352 markets– about half the total number of districts in France– for two consecutive years, 1767-68 (hereafter 1767–8 sample).[96] I convert prices in grams of silver per litre before matching them with their respective district. In Figure 19 and Figure 20, I show the level of wheat prices in 1768, as well as the dispersion of prices around the regional (province) mean. As expected, the price of wheat varied considerably across but also within provinces, providing additional evidence of the weak market integration. Figure 21 plots wheat prices from Labrousse's sample against wheat prices from the 1767–8 sample aggregated at the level of provinces. The strong correlation (0.95) between the two data sets indicates that the risk of bias due to sample selection in Labrousse's data set is relatively low.

# 4 Empirical strategy and results

## 4.1 Temperature shocks and social conflicts

Before examining the effect of local leaders' experience on the mitigation of weather-induced social conflicts, I quantify the effect of temperature shocks on the likelihood of social conflicts at the district level between 1661 and 1789. I estimate for district $i$ during season $s$ in year $t$ the reduced-form effect of temperature shocks:

respectively (Hurpin, 1984).

[96] BnF, département Sciences et techniques, S-19751, Representations aux magistrats, contenant l'exposition raisonnée des faits relatifs à la liberté du commerce des grains, & les résultats respectifs des reglemens & de la liberté.

$$Conflict_{ist} = \alpha + \beta_1 Temperature_{ist} + \delta_i + \delta_{jt} + \epsilon_{ist} \quad (1)$$

where $Conflict_{ist}$ is a dummy variable equal to one if at least one social conflict occurred in district $i$ during season $s$ in year $t$, $Temperature_{ist}$ is the measure of temperature shock during season $s$ of year $t$ in district $i$, $\delta_i$ controls for time-invariant fixed effects at the district level, and $\delta_{jt}$ accounts for the effect of common time shocks that affect simultaneously all districts in province $j$.[97] To facilitate the reading of the results, I multiply all dependent variables by 100 so that coefficients can be interpreted as the probability of conflicts expressed in percentage points. $\beta_1$ is the parameter of interest, which I expect to be positive and significant if warmer temperature is an important driver of social conflicts.

Table 3 establishes the positive and statistically significant effect of seasonal temperature shocks on the onset of social conflicts. A one standard deviation increase in seasonal temperature increases the likelihood of social conflicts by 0.1 percentage points, which is equivalent to a 5.3% increase (column 1).[98] Columns 2 to 5 present results for each of the four sub-categories of conflicts. The impact of seasonal temperature shocks on subsistence-related conflicts is positive and statistically significant at the 1% level. One standard deviation increase toward warmer temperature results in 19% increase in the probability of subsistence-related conflicts. I find no statistically significant effect between temperature shocks and fiscal conflicts as well as the mixed group of conflicts (columns 3 and 5). Finally, I find that temperature shocks increases the likelihood of conflicts against state authorities (column 4), which can be explained by several factors. One plausible channel is that the increase in the number of subsistence-related conflicts resulted subsequently in more repression in those districts, which in turn increases the likelihood that a crowd attempted to rescue a rioter being imprisoned or publicly whipped.[99] Another possible explanation is that higher temperature had psychological impacts on aggressive behaviour, leading to higher numbers of events involving verbal and physical violence against the police and the military.[100] However, the low time-frequency of my weather data conceals the possibility to draw any conclusion on the

[97] All regressions are run with Conley (1999) standard errors, allowing for spatial correlation within a 100 km radius and for infinite serial correlation.

[98] On average, there is at least one social conflict in 1.86% of the observation.

[99] For historical narratives about this type of social conflicts, see Aubert (2015, pp. 85–9) and Nicolas (2002, pp. 552–64).

[100] That hypothesis is supported by results reported in column 4 of Table 8: Only the largest temperature deviations from long-term mean significantly increase the likelihood of conflict related to state authorities. Carleton, Hsiang and Burke (2016) provide a useful discussion of the different psychological pathways linking hot temperature and conflict.

drivers of this type of conflict. Therefore, in the remaining of the paper, for the sake of brevity, I will focus only on social conflicts broadly defined and subsistence-related conflicts.

**Temperature shocks and subsistence-related conflicts.** In Appendix A, I document the transmission mechanism between weather shocks and the onset of conflicts. I show that local transitory income shocks induced by bad harvest and high food prices led to significantly more subsistence-related conflicts. Temperature shocks had no or little impact on the likelihood of other types of conflicts, through variations in grain prices. For further insights on the theoretical mechanisms driving the relationship, see Chambru (2019, Chap. 2). I provide further support to this interpretation by examining the effect of temperature shocks in rural and urban districts. Results are reported in Table 4. Estimated coefficients in columns 1 to 3 indicate the effect of temperature shocks on the onset of social conflicts is the same in rural and urban district. By contrast, the effect of temperature shock on subsistence-related conflicts was lower in more urbanised districts (columns 5 and 6). This effect could be driven by the fact that seat of provinces, which were often the largest city in the province, received particular attention from the intendants. In Table 4, columns 6, I show differences between districts that were seat of province and those which were not. There is not a statistically significant difference between these two types of districts. In other words, districts that were seat of a province, and often of various royal authorities, did not receive any specific treatment in terms of relief and/or repression.

**Robustness checks.** To address potential non-classical measurement errors and reporting bias, I estimate the specifications below: (i) I focus only on social conflicts that involved more than 50 individuals, (ii) I use additional and alternative measure of weather shocks, (iii) I estimate a logit model, (iv) I include district $\times$ decade-level controls, (v) I exclude potential outliers, and (vi) I re-estimate my baseline specification by aggregating data at the province level.

*Large-scale conflicts.* One potential concern with the definition of social conflicts I used is that if small-scale conflicts are persistently under-reported in some areas or during some years, then estimates presented in Table 3 are biased. In Table 5, I focus only on social conflicts that involved more than 50 individuals, and that were less likely to be under-reported or unseen in the archives given their importance (see Section 3.1). The estimated effects remain qualitatively unchanged in all these specifications and are consistent with those of Table 3 (columns 1 to 5).

*Alternative measures of weather.* I show that my baseline estimates are neither dependent from my definition of weather shocks, nor subject to an omitted variables bias. In Table 6,

I repeat my baseline regressions (Equation 1) using (i) temperature deviations from the long-term median (1500–1600), (ii) temperature deviation from the 50-year moving-average, and (iii) temperature level. All estimated coefficient remained positive and statistically significant. In their literature survey on the climate-economy literature, Dell, Jones and Olken (2014) emphasise that failing to include precipitation and other climatic variables could lead to omitted variable bias. In Table 7, I address this issue by adding a quadratic term to my baseline estimate (columns 1 and 4), a measure of precipitation shocks– defined in a way similar to the *Temperature* variable– (columns 2 and 5), and lag and lead values of the *Temperature* variable. All specifications yields consistent results with those presented in Table 3.

*Adding control variables.* Other factors may have influenced the onset of social conflicts throughout the 17th and the 18th centuries. To address this, I control for various geographical characteristics (latitude, topographic position index, distance from Paris, distance from the coast) as well as socio-economic characteristics (urbanisation rate, presence of Roman hubs, bishop, trade regime, level of salt tax, active parliament). For the influences of these factors to vary over time, I interact each of them with decade fixed effects. Results are reported in Table 9. I find that controlling for these observable characteristics has no effect on the estimated effect of temperature shocks on social conflicts.

*Logit estimates.* Another concern may arise from the fact that there is an important number of zeroes in my dependent variables, since using LPM models may yield imprecise approximation of the marginal effects. Table 10 presents my logit results for social conflicts and subsistence-related conflicts. Columns 2 and 4 control for precipitation shocks. All coefficients on the *Temperature* variables are statistically significant at the 1% level.

*Potential outliers.* A final concern is that my results are driven by outliers, either peculiar districts or exceptional years. In the subsequent analysis, I focus on Paris and the years 1788–9. Paris was the most populated city of France, as well as the center of its economic and administrative activity. Finding the grain necessary to insure the flow of food supplies was an extremely complex task. The level of supplies did not depend on the weather conditions in Paris, but in the neighbouring districts. In addition, food riots were also common among the hungry poor even when the grain supply of Paris was not threatened (Kaplan, 1996). Thus, including the district of Paris in my estimates may downward bias my results because the correlation between temperature shocks and the onset of conflict could be weaker in this district.

In spring 1788, a drought struck France and threatened the prospect of the coming harvest, which intensified the already existing social turmoil (Waldinger, 2014). Many revolts find their

roots in the fight against seigneurial dues, whereas a slump in the manufacturing activity left many households behind in textile towns. One can observe a significant increase in the number of social conflicts in those two years, many of which may mixed economic motives with socio-political motives thus undermining the possible correlation between temperature shocks and social conflicts.

In Table 11, I re-estimate my baseline specifications, where I add an interaction term to account for the fact Years 1788–9 and Paris may have a distinctive pattern due to historical events and intrinsic characteristics. The estimated coefficient for the interaction term are negative and statistically significant at 1% (columns 5 to 6), underlying the fact that temperature shocks played a lesser role all over France during the Years 1788–9, and in Paris during the entire 17th and 18th centuries.

*Province level.* Table 12 reports results from re-estimating Equation 1 at the level of provinces. All coefficient are qualitatively similar to the baseline estimates. The magnitude of the effect of temperature shocks also remains the same, albeit they are smaller. A one standard deviation increase toward warmer temperatures increases the likelihood of social conflicts and subsistence-related conflicts by 4.9% and 9.4%, respectively.

Overall, I find that the effect of temperature shocks is larger on subsistence-related conflicts than in social conflicts broadly defined. This result is driven by the fact that temperature shocks had little or no effect on other types of conflicts. This result implies that previous research that focus on conflicts and/or revolts broadly defined may have actually underestimated the true effect of weather shocks (e.g. Jia, 2014). This difference in magnitude is consistent with the fact that a plunge in income is one of the driving factors of food riots, but not systematically of other types of conflicts.

### 4.2 The role of local leaders and social conflicts

I now turn to the investigation of the role of local leaders in the mitigation of weather shocks. In Section 2, I provide historical evidence that intendants were a corner stone in the government strategy of relief. I document that the intendants' level of local experience was a key determinant of their ability to attenuate the negative effect of weather shocks.[101] To test this hypothesis, I add an interaction term to Equation 1 in order to capture differential effect of intendants' local experience. The specification is as follows:

[101] Given that they share a relatively homogeneous socio-economic backgrounds, have pursue a legal training, and occupy similar position prior to their appointment as intendant, only natural talent and experience should be important determinant of their competences.

$$Conflict_{ist} = \alpha + \beta_1 Temperature_{ist} + \beta_2 Temperature_{ist} \times Experience_{jt} + \delta_i + \delta_{jt} + \epsilon_{ist} \quad (2)$$

where $Conflict_{ist}$ is a dummy variable equal to one if at least one social conflict occurred in district $i$ during season $s$ in year $t$, and $Temperature_{ist}$ is the measure of temperature shock during season $s$ of year $t$ in district $i$. $Experience_{jt}$ is a measure of intendants' local experience in province $j$ in year $t$ defined alternatively as: (i) *Local experience*, a dummy variable equal to one if the intendant in province $j$ has some local experience, and zero otherwise; (ii) *Years of experience*, the log of the total number of years of experience of the intendant in province $j$ in year t; (iii) *Exp. years*, a categorical variable splitting the level of local experience in province $j$ in four categories: "No experience", "1–5 years of experience", "6–10 years of experience", and "more than 10 years of experience". $\delta_i$ controls for time-invariant fixed effects at the district level, and $\delta_{jt}$ accounts for the effect of common time shocks that affect simultaneously all districts in province $j$. $\beta_2$ is the parameter of interest, which I expect to be negative and significant if intendants with higher level of local experience were better able to mitigate the negative effect of temperature shocks.

Table 14 presents the regression analysis of the interaction of temperature shocks with various measures of intendants' local experience on social conflicts at the district level. In columns 1 to 3, the estimated interaction effect between intendants' local experience and social conflicts are positive but not statistically significant. This is not surprising given that sporadic conflicts about regional particularities, fights over noble privileges and seigniorial authorities, uprisings against the agents of tax farmers,[102] and the like were not the main concern of intendants who focused on their legal duties, raising direct taxes for the King and maintaining social order by making sure that grains were not missing (see Section 2.2). Columns 4 to 6 repeat the same analysis with subsistence-related conflicts as dependent variable. All estimated interaction effect are negative and statistically significant. These results show that in districts that had a provincial intendant with higher levels of local experience the effect of temperature shock is of lesser magnitude with respect to districts that had a provincial intendant with less or no local experience. Miller (1999) has argued that French administration successfully created effective methods of securing grain, influencing prices and balancing tensions among those who produced grains, those who consumed it, and those who commercialised it. Intendants with higher levels of local experience were to some extent

[102] The General Tax Farm (*Ferme générale*) was a private financial partnership that leased from the King the right to collect indirect taxes for a profit. Its agents were often hatred by the population.

better able to do so, since crop failures resulted less often in subsistence-related conflicts. In Table 14, column 5, the estimated coefficient $\beta_2$ is equal to -0.015, suggesting that 5 years of local experience were sufficient to mitigate the effect of one standard deviation increase in temperature. In column 6, I split the variable *Years of experience* in four variables to analyse if the effect of experience is strictly linear. Reported coefficient in column 6 show that the role of local experience did not decay with time. In other words, the prevention of grain scarcity and the management of food supplies remained at the top of their priorities list, even when their tenure lasted much longer than usual. These results are very much in line with the claim of Necker that, more than anything else, local experience is a key factor in intendants' abilities to rule well their province.[103] I further investigate the role of intendants in the mitigation of weather shocks by regressing my conflict variables on temperature shocks and the interaction between temperature shocks and intendant-province fixed effects. The purpose of this exercise is to identify if intendants had at all an effect on the onset of social conflicts during their tenure in their province. The separated estimated coefficients for each intendant-province are displayed in Figure 23 and Figure 24. The coefficients are quite heterogeneous across intendants, and suggest that some intendants persistently exacerbated the effects of temperature shocks on socials conflicts, whereas others successfully mitigate the effects of temperature shocks on subsistence-related conflicts. This exercise is uninformative on which intendants' characteristics mattered, but confirms the hypothesis that intendants could have a significant impact on the onset of conflicts in their province. One concern is that the intendants that stayed longer in one province were better able to manage food supplies and prevent subsistence conflicts, but also to hide conflicts. It is unlikely to be the case for two reasons. First, intendants were not the only authority to report social conflicts, and about 15 per cent of the *émotions populaires* collected by Nicolas (2002) are drawn from judiciary archives. Second, the resulted presented in columns 1 to 3 in Table 14 show that the experience of intendants had no effect of social conflicts other than subsistence conflicts. There is no historical evidence to support the fact that intendants with more experience would have a higher propensity to hide only subsistence conflicts rather than all types of conflicts

**The rotation of intendants.** During summer 1708, Dreux-Louis Dugué de Bagnols obtained from Louis XIV the authorisation to retire, after serving as intendant of Flanders for 24 years. This resignation ignited an unprecedented game of musical chairs in which 9 intendants

[103] In his *Mémoire concernant Mrs les Intendans*, Richer d'Aube (pp. 12–6, 277–32) emphasised similar traits to describe what would make a good intendants.

participated.[104] Within few months, the Crown had moved and/or changed about a third of its provincial leaders.[105] I use this unique historical event to provide further support to my results, by exploring the effect of this sudden and unexpected rotation of intendants. To do so, I repeat the same analysis as above with a sub-sample of years (1703–13) during which there had been an important turnover across intendants. Given the particularly adverse weather conditions of the first decade of the 18th century, had intendants an important role to play in the mitigation of weather shocks, and had local experience played a significant impact on their abilities to do so, one can expect the magnitude of the coefficients to be much higher than over the entire period. The results in Table 15 are similar to the baseline estimates and show that intendants' with local experience (column 4) or higher levels of local experience (columns 5 and 6) were better able to mitigate the effect of temperature shocks and to reduce the likelihood of subsistence-related conflicts.

Necker further suggests that it was important for an intendant to remain in one province, because transfer of experience from one province to another was limited. Upon moving, the intendants had to learn again about the local customs, state of the agriculture, local competing authorities, his new network of subordinates and the like. Results from estimating Equation 2 with the level of previous experience instead of the level of local experience are presented in Tables 16 and 17. All coefficients from the interaction term are statistically insignificant (sample 1703–13) or positive and statistically significant, suggesting that, if anything, intendants with higher levels of previous experience performed worse than their counterparts. One explanation is that these intendants tried to implement policies they experienced in the past, but these later were either maladjusted or opposed by population and/or notables.[106] This suggests that more than human capital, social capital was of particular importance for the intendants. Another explanation is that the nomination process was not random, and more able intendants– those with higher levels of experience– were appointed to provinces considered as more prone to rebellions.

**The selection of intendants.** To better understand this process, I now briefly document the selection of intendants by investigating the determinants of their survival in their province. Intendants were royal commissioners and as such had to obey to the King who could decide

[104] BnF, NUMP-771, Journal historique sur les matières du tems, août 1708, page 97

[105] These provinces are in alphabetical order: Alençon, Auvergne, Bourges, Flanders, Franche-Comté, Limoges, Maubeuge, Picardie, Poitiers. In the province of Limoges, the intendant, Jean Rouillé de Fontaine (1703–8), also decided to resign after he successfully bought an office of *intendant du commerce*. Three of the positions were held by intendants with no prior experience in the post.

[106] See anecdotal evidence in Section 2.3.

to dismiss them or dispatch them to another province at any time. They could, however, also decide to resign by themselves either to retire or to seize a new professional opportunity, for which they could have used their personal connections. A concern, therefore, is that there may exist a correlation between intendants' abilities and the length of their tenure. Presumably more capable intendants could look for better outside options and give up their position after only a few years. Or maybe the Crown successfully maintained better intendants longer in their current position and rapidly dismissed the worst intendants. The Crown could also reward its best intendants by appointing them in wealthier and more peaceful provinces. The discretionary nature of appointments and resignations means that if there could be biases in the selection process of intendants. To better understand this process, I use Cox proportional hazards model to estimate the risk that the intendant of province $j$ in year $t$ is not the same in year $t+1$.

Results are reported in Figure 25. I find that the level of conflicts in the past five years has no effect on the likelihood of leaving or being dismissed from one's current position of intendant. Similarly, the wealth of the province–measured by the total tax per capita–, the distance to Paris, and the presence of an important trade port did not significantly impact the year-on-year survival rate of the intendants.[107] The only large and significant differences emerge from intendants in *Pays d'État* and outside of the free trade zone (*Cinq Grosses Fermes*) who seem less likely to give up their position or being dismissed from one year to another. Overall, these results suggest that contrary to the previous hypothesis advanced in the historiography, intendants were not leaving as quickly as possible provinces that were the furthest away from Paris or the poorest.[108] Besides, it seems that the level of conflicts had no significant impact on the decision of the Crown to maintain an intendant in his province, or on the intendant's decision to leave for another position. Thus, no objective criteria directly related to social conflicts, and more specifically to subsistence-related conflicts, had an impact on the allocation of intendants over time, which reduces some of the concerns regarding the endogeneity of the level of local experience.

### 4.3 Religious institutions and social conflicts

Were the tithes and religious charity an efficient buffer against weather shocks? The Clergy, and in particular bishops, sometimes worked hand-in-hand with state authorities to assuage

[107] Franck (2016, p. 64) adopts a similar strategy to circumvent the lack of GDP data at the *département* level in France in the 1870s.
[108] See Lebrun (1971).

the misery of the poorest (Molinier, 1984, p. 49). There are, however, also numerous historical evidence to suggest that the contribution of religious institutions to poor relief was sometimes rather limited, despite the religious canon and/or their financial resources (see Section 2.3. To elucidate this question, I analyse whether temperature shocks affect social conflict differentially in districts in which average monastic income per capita– mostly derived from rent and tithes–, and as such potential for poor relief, was high. My regression model is the following:

$$Conflict_{ist} = \alpha + \beta_1 Temperature_{ist} + \beta_3 Temperature_{ist} \times Income_i + \delta_i + \delta_{jt} + \epsilon_{ist} \tag{3}$$

where $Conflict_{ist}$ is a dummy variable equal to one if at least one social conflict occurred in district $i$ during season $s$ in year $t$, and $Temperature_{ist}$ is the measure of temperature shock during season $s$ of year $t$ in district $i$. $Income_i$ is a measure of monasteries' income in district $i$, and proxy for potential for religious charity given that a large share of the monasteries' income was derived from the tithes. $\delta_i$ controls for time-invariant fixed effects at the district level, and $\delta_{jt}$ accounts for the effect of common time shocks that affect simultaneously all districts in province $j$. $\beta_3$ is the parameter of interest, which I expect to be negative and significant if religious institutions fulfilled their duties of charity– the higher the financial resources of these institutions, the more able they were to provide charity and help local communities to cope with temperature shocks– and positive and significant if religious institutions evaded their duties– higher level of resource extraction without redistribution left peasants with less resources to cope with negative transitory income shocks.

Table 18 reports the findings from my empirical examination of the aforementioned mechanisms. In columns 1 and 4, I present results from estimating Equation 3. The interaction term is defined as the log of abbeys' income per capita in district $i$ in 1780. In Figure 22, I display the correlation between total monastic income per capita per district in 1750 and 1780. The income of religious institutions remained relatively stable and showed little variation over the course of the 18th century. In column 4, the coefficient $\beta_3$ equals 0.77 and is statistically significant at 10%, indicating that districts in which monasteries' income per capita was higher were more prone to food riots. One explanation is that while abbeys were extracting parts of the agricultural output through the tithes, they might not have redistributed it enough in times of dire need.[109] This interpretation is in line with anecdotal evidence presented in Section 2.3.

[109] It should be noted that the Church also extracted revenues from the rent of the land it owned. During the 18th century, the Church held about 6 per cent of the land in France, but with considerable regional variations. Its

Thus, districts with higher resource extraction were then worse off and people resorted more often to conflicts.

In November 1694, the King enforced a new temporary law to constraint abbeys without an abbot at their head to spend one third of their income in poor relief for a year, which is equivalent to the customary amount devoted to poor relief in the religious canon.[110] Few months later, a new edict was enforced to remind these abbeys of their obligations, which were in line with the "spirit of the sacred scriptures and apostolic constitution, which divided the income of the benefices into three parts: one to support the necessary and ordinary costs, another one to support the owner, and the third one for the poor".[111] These two edicts suggest that, a priori, monasteries did not redistributed much of their income. In columns 2 and 5, I trim my sample to year 1694–6 to explore the effect of this measure on the efficiency of religious poor relief. Thus, my analysis relies on a differences-in-differences strategy and compares the likelihood of social conflicts in districts that explicitly received charity in 1695 from monasteries mentioned in the Edict with districts in which monasteries were not enforced to distribute poor relief. As expected, the estimated coefficient is negative and statistically significant for subsistence-related conflicts, suggesting the provision of poor relief by these monasteries helped people in these districts to cope significantly better with the temperature shocks. The effect of redistribution had no significant impact on social conflicts broadly defined, which encompass many types of conflicts that are not primarily driven by income shocks.

Finally, I further explore the question of resource extraction and redistribution by analysing the effect of noble density on the onset of conflicts. Throughout the 17th and the 18th centuries, nobles were, relatively to their population share, the largest landowners in France (e.g. Lefebvre, 1972, pp. 887–910) and appropriated significant shares of the agricultural output. It should be noted that large wealth inequalities existed within the nobility and across provinces. Documenting precisely the effect of noble landownership and the underlying causal mechanism driving this relationship would require extensive data collection and is beyond the scope of this paper. Results presented in columns 3 and 6 are, therefore, only suggestive and complementary to results previously shown. To circumvent the issue of data limitations, I follow Squicciarini and Voigtländer (2015) and gather information on the density of noble

holdings raised to up to 40 per cent in the north, but dropped to below 2 per cent in the south (Hoffman, 2006, p. 73). For more details on the spread of Church ownership, see Guillot (1963, pp. 311-23), (Lefebvre, 1972, pp. 15–17, 892), and Lemarchand (1989, pp. 325-27).

[110] BnF, IFN-8605561, Arrest du Conseil d'Etat du Roy, 20 November 1694.

[111] BnF, IFN-8605598, Arrest du Conseil d'Etat du Roy, 4 April 1695.

families between 1650 and 1789. For each province, I create a decennial index, named *Nob. Index* and calculated as the sum of the number of noble families in province $j$ during decade $d$. Columns 3 and 6 repeat the same analysis as columns 1 and 4, but substituting the log of the monasteries' income per capita by the index of noble density. The results are qualitatively similar, though weaker. In column 6, the coefficient $\beta_3$ equals 0.022 and is statistically significant at 1% level, suggesting that higher level of resource extraction, either through rents or taxes paid to nobles, could have impeded the resilience of peasant communities in the face of adverse weather conditions. Although I can not formally test it, grievances are another channel through which resource extraction may have influenced the likelihood of conflicts.

# 5 Conclusion

This paper studies the socio-economic consequences of weather shocks in early modern France. I posit that temperature shocks had a significant impact on living standards, through their effect on agricultural output and crop prices. Temperature shocks increased household's economic vulnerability by temporarily reducing their disposable real income. I provide evidence that temperature shocks significantly increased the likelihood of subsistence-related conflicts, such as the interceptions of grains carts full and the loots of public granary. Local communities implemented various strategies to build resilience against these weather-induced transitory negative income shocks, which were also a central concern for the administration willing to maintain social order and prevent rebellions.

In this regard, the agents of the King in the provinces, namely the intendants, had a very important role as depositaries for the collection of taxes, the regulation of trade, and the monitoring of grains supply. Intendants were a quite homogeneous group and most of the time shared a similar socio-economic and professional background. Discussing the quality of a good intendant, Necker emphasised the importance of the time spent in a province to acquire local experience and accumulated human and social capital. Following Necker's argument, I build a new database on the universe of French intendants appointed between 1661 and 1789 and investigate whether intendants with a higher level of local experience were better able to mitigate the negative effect of temperature shocks. I find that there were substantially less subsistence-related conflicts in province managed by intendants with higher levels of local experience. The likelihood of social conflict, however, remained unaffected by the intendant's local experience, suggesting that these former specifically and consistently took actions to alleviate the stress of local communities and prevent food riots, but did not intervene to avert other conflicts. This interpretation is supported by historical evidence.

I further document the role religious institutions in the provision of poor relief. The tithe was a compulsory contribution, equal to one-tenth of the agricultural production, to religious institutions, which, according the Catholic canon law, had to devote one-third of the income derived from the tithe to poor relief and charity. I show that districts in which monasteries' income per capita was higher were less resilient to temperature shocks and more prone to food riots. This result suggests that while monasteries were extracting parts of the agricultural output through the tithes, they might not have redistributed enough. This finding is supported by the fact when the King temporarily enforced a law compelling monasteries to respect the canon law, the likelihood of subsistence-related conflicts is lower in districts in which monasteries' income per capita was high.

Taken together, the evidence suggests that weather shocks, and more generally climate variability, exerted a strong influence on pre-industrial societies. State interventions under the care of experimented local leaders contributed to mitigate parts of the negative economic effect induced by weather shocks. In contrast, "private" social insurance system under the aegis of the church, namely the tithes, failed to fulfil its role and provide sufficient relief to alleviate the effects of weather shocks. Of course, these results obtained for 17th- and 18th-century France can not be immediately generalised to countries and situations characterised by a very different institutional and international context.

## References


**Acemoglu, Daron, Francisco A. Gallego, and James A. Robinson.** 2014. "Institutions, Human Capital, and Development." *Annual Review of Economics*, 6(1): 875–912. 6

**Albers, Hakon, Christoph Gornott, and Silke Hüttel.** 2017. "How Do Inputs and Weather Drive Wheat Yield Volatility? The Example of Germany." *Food Policy*, 70: 50–61. 4

**Alfani, Guido, and Cormac Ó Gráda.** 2018. "The Timing and Causes of Famines in Europe." *Nature Sustainability*, 1(6): 283–288. 11

**Anderson, Robert Warren, Noel D. Johnson, and Mark Koyama.** 2017. "Jewish Persecutions and Weather Shocks: 1100–1800." *The Economic Journal*, 127(602): 924–958. 6

**Antoine, Jean-Marc.** 2009. "L'histoire du climat par ses extrêmes. Sources géohistoriques et inondations dans les Pyrénées depuis le Petit Âge Glaciaire." *Archéologie du Midi médiéval*, 27: 143–155. 9, 15

**Appleby, Andrew B.** 1979. "Grain Prices and Subsistence Crises in England and France, 1590–1740." *Journal of Economic History*, 39(4): 865–887. 8

**Arbellot, Guy, Jean-Pierre Goubert, Jacques Mallet, and Palazot Yvette.** 1986. *Carte des Généralités, Subdélégations et Élections en France à la veille de la Révolution de 1789.* Éditions du C.N.R.S. 19

**Armstrong, John A.** 1972. "Old-Regime Governors: Bureaucratic and Patrimonial Attributes." *Comparative Studies in Society and History*, 14(1): 2–29. 13

**Arnoux, Mathieu.** 2010. "Pour une économie historique de la dîme." *La dîme dans l'Europe médiévale et moderne*, , ed. Roland Viader, 145–160. Presses Universitaires du Mirail. 7

**Aubert, Gauthier.** 2015. *Révoltes et répressions dans la France moderne.* Armand Collin. 7, 21, 27

**Bai, Ying, and James Kai-Sing Kung.** 2011. "Climate shocks and Sino-nomadic Conflict." *Review of Economics and Statistics*, 93(3): 970–981. 6

**Balso, Raoul.** 1993. "Les catastrophes naturelles dans le Biterrois au travers des Secours royauy de 1750 à 1790." *Météorologie et catastrophes naturelles dans la France méridionale à l'époque moderne. Actes du colloque de 1992*, , ed. Anne Blanchard, Henri Michel and Élie Pélaquier, 77–89. Montpellier, Université Paul-Valéry. 17

**Barbiche, Bernard.** 2012. *Les institutions de la monarchie française à l'époque moderne, XVI$^{e}$–XVIII$^{e}$ siècle.* Presses Universitaires de France. 14

**Bazzi, Samuel, and Christopher Blattman.** 2014. "Economic Shocks and Conflict: Evidence from Commodity Prices." *American Economic Journal: Macroeconomics*, 6(4): 1–38. 10

**Beales, Derek.** 2003. *Prosperity and Pplunder: European Catholic Monasteries in the Age of Revolution, 1650–1815.* Cambridge University Press. 17

**Beaurepaire, Charles de.** 1889. *Renseignements statistiques sur l'état de l'agriculture vers 1789.* Rouen : Imprimerie Espérance Cagniard. 19

**Béaur, Gérard, and Jean-Michel Chevet.** 2017. "France." *Famine in European History*, , ed. Guido Alfani and Cormac Ó Gráda, 73–100. Cambridge University Press. 9

**Becker, Sascha O., and Ludger Woessmann.** 2009. "Was Weber Wrong? A Human Capital Theory of Protestant Economic History." *Quarterly Journal of Economics*, 124(2): 531–596. 3

**Beik, William.** 2005. "The Absolutism of Louis XIV as Social Collaboration." *Past & Present*, 188(1): 195–224. 12

**Beik, William.** 2015. *Protest and Rebellion in Seventeenth-Century France.* Palgrave Macmillan. 21, 22

**Ben-Ari, Tamara, Julien Boé, Philippe Ciais, Remi Lecerf, Marijn Van der Velde, and David Makowski.** 2018. "Causes and Implications of the Unforeseen 2016 Extreme Yield loss in the Breadbasket of France." *Nature communications*, 9(1): 1627. 2, 4

**Ben-Ari, Tamara, Juliette Adrian, Tommy Klein, Pierluigi Calanca, Marijn Van der Velde, and David Makowski.** 2016. "Identifying Indicators for Extreme Wheat and Maize Yield Losses." *Agricultural and Forest Meteorology*, 220: 130–140. 2, 4, 23

**Bercé, Yves Marie.** 1974. *Histoire des croquants : Étude des soulèvements populaires au XVII$^{e}$ siècle dans le sud-ouest de la France.* Vol. 2, Librairie Droz. 7

**Besley, Timothy, Jose G. Montalvo, and Marta Reynal-Querol.** 2011. "Do Educated Leaders Matter?" *The Economic Journal*, 121(554): F205–F227. 5, 6

**Biard, Michel.** 2007. *Les lilliputiens de la centralisation : des intendants aux préfets, les hésitations d'un modèle français.* Editions Champ Vallon. 13

**Bignon, Vincent, Eve Caroli, and Roberto Galbiati.** 2017. "Stealing to Survive? Crime and Income Shocks in Nineteenth Century France." *The Economic Journal*, 127(599): 19–49. 6

**Blattman, Christopher, and Edward Miguel.** 2010. "Civil war." *Journal of Economic Literature*, 48(1): 3–57. 6

**Bligny-Bondurand, E.** 1908. *Cahiers de doléances des sénéchaussées de Nimes pour les États généraux de 1789.* Nimes : Imprimerie A. Chastanier. 19

**Boiron, Michel.** 2008. *L'action des intendants de la généralité de Limoges de 1683 à 1715.* Presses Universitaires de Limoges. 13, 14, 15, 17, 24

**Bordes, Maurice.** 1960. "Les intendants de Louis XV." *Revue historique*, 223(1): 45–62. 12

**Bordes, Maurice.** 1962. "Un intendant éclairé de la fin de l'Ancien Régime. Claude-François Bertrand de Boucheporn." *Annales du Midi : revue archéologique, historique et philologique de la France méridionale*, 74(58): 177–194. 15

**Bouton, Cynthia A.** 2000. "Les mouvements de subsistance et le problème de l'économie morale sous l'Ancien Régime et la Révolution française." *Annales historiques de la Révolution française*, 319(1): 71–100. 7, 22

**Boxell, Levi.** 2017. "Droughts, Conflict, and the African Slave Trade." `https://mpra.ub.uni-muenchen.de/81924/` Working Papers. 6

**Boyer de Sainte-Suzanne, Émile-Victor-Charles de.** 1865. *Les intendants de la généralité d'Amiens (Picardie et Artois).* Paris : Librairie Administrative de Paul Dupont. 24

**Bricourt, Michel, Marcel Lachiver, and Denis Queruel.** 1974. "La crise de subsistance des années 1740 dans le ressort du Parlement de Paris." *Annales de démographie historique*, (1): 281–333. 16, 19

**Brossault, Colette.** 1999. *Les intendants de Franche-Comté 1674–1790.* La Boutique de l'histoire éditions. 13, 14, 24

**Brumont, Stéphane.** 2010. "La question de la dîme dans la France moderne." *La dîme dans l'Europe médiévale et moderne*, , ed. Roland Viader, 161–189. Presses Universitaires du Mirail. 7

**Buggle, Johannes, and Ruben Durante.** 2017. "Climate Risk, Cooperation and the Co-Evolution of Culture and Institutions." London, Centre for Economic Policy Research Working Paper DP12380. 2

**Bujeaud, Victor.** 1860. *Chronique protestante de l'Angoumois XVI$^{e}$, XVII$^{e}$, XVIII$^{e}$ siècles.* Meyrueis : Goumard. 16

**Burke, Marshall, Solomon M. Hsiang, and Edward Miguel.** 2015. "Climate and Conflict." *Annual Review of Economics*, 7(1): 577–617. 6

**Burley, Peter.** 1981. "Louis XVI and a New Monarchy: An Institutional and Political Study of France l768-l778." PhD diss. University of London. 13

**Bussière, Georges.** 1877. *Études historiques sur la Révolution en Périgord. 1ère partie : La Bourgeoisie périgourdine au XVIII^e siècle.* Bordeaux : Charles Lefebvre Éditions. 16

**Bussière, Georges.** 1885. *Études historiques sur la Révolution en Périgord. 2ème partie : Le mouvement életoral de 1789.* Vol. 2, Bordeaux : Charles Lefebvre Éditions. 19

**Cameron, Iain A.** 1981. *Crime and Repression in the Auvergne and the Guyenne, 1720–1790.* Cambridge University Press. 20, 21

**Campbell, Bruce M. S., and Cormac Ó Gráda.** 2011. "Harvest Shortfalls, Grain Prices, and Famines in Preindustrial England." *Journal of Economic History*, 71(4): 859–886. 11

**Carleton, Tamma A., and Solomon M. Hsiang.** 2016. "Social and Economic Impacts of Climate." *Science*, 353(6304): aad9837. 23

**Carleton, T., Solomon M. Hsiang, and Marshall Burke.** 2016. "Conflict in a Changing Climate." *The European Physical Journal Special Topics*, 225(3): 489–511. 27, 3

**Cathelineau, Léonce.** 1912. *Cahiers de doléances des sénéchaussées de Niort et de Saint-Maixent et des communautés et corporations de Niort et Saint-Maixent pour les États généraux de 1789.* Niort : Imprimerie Nouvelle G. Clouzot. 17, 19

**Ceglar, Andrej, Andrea Toreti, Rémi Lecerf, Marijn Van der Velde, and Frank Dentener.** 2016. "Impact of Meteorological Drivers on Regional Inter-annual Crop Yield Variability in France." *Agricultural and Forest Meteorology*, 216: 58–67. 9

**Cerisier, Patrick.** 1995. "Les subdélégués de l'intendant Taboureau et le commerce des grains en Hainaut à l'époque de Terray (1769–1774)." *Revue du Nord*, 77(309): 29–58. 14

**Chambru, Cédric.** 2019. "Environmental Shocks, Religious Struggle, and Resilience: A Contribution to the Economic History of Ancien Régime France." PhD diss. Université de Genève. 7, 28

**Chaney, Eric.** 2013. "Revolt on the Nile: Economic shocks, Religion, and Political Power." *Econometrica*, 81(5): 2033–2053. 6

**Chapalalain-Nougaret, Christine.** 1984. "Les secours en temps de disette au XVIIIe siècle : L'exemple du diocèse de Rennes." *Annales de Bretagne et des pays de l'Ouest*, 91(2): 135–155. 17

**Chen, Qiang.** 2015. "Climate Shocks, State Capacity and Peasant Uprisings in North China during 25–1911 ce." *Economica*, 82(326): 295–318. 6, 7

**Christian, Cornelius, and James Fenske.** 2015. "Economic Shocks and Unrest in French West Africa." Centre for the Study of African Economies, University of Oxford. 6

**Christian, Cornelius, and Liam Elbourne.** 2018. "Shocks to Military Support and Subsequent Assassinations in Ancient Rome." *Economics Letters*, 171: 79–82. 2

**Cohn, Samuel Kline.** 2009. *Lust for Liberty: The Politics of Social Revolt in Medieval Europe, 1200–1425.* Harvard University Press. 20

**Collier, Paul, and Anke Hoeffler.** 1998. "On Economic Causes of Civil War." *Oxford economic papers*, 50(4): 563–573. 10

**Collins, James B.** 2009. *The State in Early Modern France.* Cambridge University Press. 12, 18

**Cook, C. Justin.** 2014. "Potatoes, Milk, and the Old World Population Boom." *Journal of Development Economics*, 110: 123–138. 9

**D'Argenson, René-Louis de Voyer.** 1869*a*. *Journal et mémoires du marquis d'Argenson.* Vol. I, Librairie Jules Renouard. 12, 14

**D'Argenson, René-Louis de Voyer.** 1869*b*. *Journal et mémoires du marquis d'Argenson.* Vol. II, Librairie Jules Renouard. 16

**Daudin, Guillaume.** 2010. "Domestic Trade and Market Size in Late Eighteenth-Century France." *Journal of Economic History*, 70(3): 716–743. 10

**Daux, Valérie.** 2013. "Reconstruction du climat à partir de la composition isotopique de l'oxygène et du carbone des cernes d'arbres." *La Météorologie*, 80: 14–22. 24

**Daux, V., I. Garcia de Cortazar-Atauri, P. Yiou, I. Chuine, E. Garnier, E. Le Roy Ladurie, O. Mestre, and J. Tardaguila.** 2012. "An Open-access Database of Grape Harvest Dates for Climate Research: Data Description and Quality Assessment." *Climate of the Past*, 8(5): 1403–1418. 24, 53

**Davranches, Louis.** 1897. *Le revenu de l'abbaye du Bec à la fin du XVIII$^{e}$ siècle.* Sotteville-lès-Rouen : Imprimerie de E. Lecourt. 18

**Degroot, Dagomar.** 2018. "Climate Change and Society in the 15th to 18th Centuries." *Wiley Interdisciplinary Reviews: Climate Change*, 9(3): e518. 2

**Dell, Melissa.** 2012. "Insurgency and Long-run Development: Lessons from the Mexican Revolution." *Unpublished manuscript, Harvard Univ., Cambridge, MA*. 6

**Dell, Melissa, Benjamin F. Jones, and Benjamin A. Olken.** 2014. "What Do We Learn from the Weather? The New Climate-Economy Literature." *Journal of Economic Literature*, 52(3): 740–98. 6, 23, 29

**Didier, Sébastien.** 2014. "Du réseau au maillage administratif, la construction territoriale des subdélégations bretonnes de 1689 à 1789." *Annales de Bretagne et des pays de l'Ouest*, 121(4): 81–106. 19

**Dieterle, Steven G., and Andy Snell.** 2016. "A Simple Diagnostic to Investigate Instrument Validity and Heterogeneous Effects When Using a Single Instrument." *Labour Economics*, 42: 76–86. 3

**Dixon, Jeffrey.** 2009. "What Causes Civil Wars? Integrating Quantitative Research Findings." *International Studies Review*, 11(4): 707–735. 6

**Doyle, William.** 2011. *The Oxford Handbook of the Ancien Régime.* Oxford University Press. 8

**Dube, Oeindrila, and Juan F. Vargas.** 2013. "Commodity Price Shocks and Civil Conflict: Evidence from Colombia." *The Review of Economic Studies*, 80(4): 1384–1421. 6, 10

**Duffaud, M.** 1861. "Notes sur les prix des grains à Poitiers, depuis trois siècles." *Mémoires de l'Académie des Sciences de l'Institut Impérial de France*, 17: 221–337. 16

**Dyer, Christopher.** 2012. "Poverty and its Relief in Late Medieval England." *Past & Present*, 216(1): 41–78. 18

**El Kordi, Mohamed.** 1970. *Bayeux aux XVII$^{e}$ et XVIII$^{e}$ siècles. Contribution à l'histoire urbaine de la France.* E.P.H.E., VIe section Sciences Économiques et Sociales. 18

**Esmonin, Edmond.** 1964. *Étude sur la France des XVII$^{e}$ et XVIII$^{e}$ siècles.* Presses Universitaires de France. 24

**Expilly, Jean-Joseph.** 1763–68. *Dictionnaire géographique, historique et politique des Gaules et de la France.* Vol. 6, Amsterdam. 12, 20, 25

**Favier, René.** 2007. "Une aide instrumentalisée : l'impôt et l'indemnisation des catastrophes naturelles dans la France du XVIII$^{e}$ siècle." *Les modalités de paiement de l'Etat moderne : adaptation et blocage d'un système comptable*, , ed. Marie-Laure Legay, 107–132. Comité d'Histoire économique et financière. 15

**Feld, Lars P., and Christoph A. Schaltegger.** 2010. "Political Stability and Fiscal Policy: Time Series Evidence for the Swiss Federal Level since 1849." *Public Choice*, 144(3-4): 505–534. 6

**Fenske, James, and Namrata Kala.** 2017. "1807: Economic Shocks, Conflict and the Slave Trade." *Journal of Development Economics*, 126: 66–76. 6

**Field, Christopher B., Vicente R. Barros, M. D. Mastrandrea, Katharine J. Mach, M. A.-K. Abdrabo, N. Adger, Y. A. Anokhin, O. A. Anisimov, D. J. Arent, J. Barnett, et al.** 2014. "Summary for Policymakers." *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, 1–32. Cambridge University Press. 2

**Franck, Raphaël, and Stelios Michalopoulos.** 2017. "Emigration during the French Revolution: Consequences in the Short and Longue Durée." National Bureau of Economic Research Working Paper 23936. 1, 2

**Franck, Raphël.** 2016. "The Political Consequences of Income Shocks: Explaining the Consolidation of Democracy in France." *Review of Economics and Statistics*, 98(1): 57–82. 34

**Franck, Raphël, and Oded Galord.** 2017. "Technology-Skill Complementarity in Early Phases of Industrialization." National Bureau of Economic Research Working Paper 23197. 11

**Frêche, Georges.** 1974. *Toulouse et la région Midi-Pyrénées au siècle des Lumières (vers 1670–1789).* Éditions Cujas. 9, 15

**Galloway, Patrick R.** 1986. "Long-Term Fluctuations in Climate and Population in the Preindustrial Era." *Population and Development Review*, 12(1): 1–24. 1

**Galloway, Patrick R.** 1994. "Secular Changes in the Short-term Preventive, Positive, and Temperature Checks to Population Growth in Europe, 1460 to 1909." *Climatic Change*, 26(1): 3–63. 1

**Garnier, Emmanuel, and Frédéric Surville.** 2010. *Climat et révolutions : Autour du Journal du négociant rochelais Jacob Lambertz (1733–1813).* Saintes : Le Croît Vif. 10

**Georges, Jean.** 1920. "Mercuriales d'Angoulême, de Cognac et de Jarnac." *Mémoires de la Société Archéologique et d'Historique de la Charente*, XI: 3–93. 16

**Geraud-Perracha, Guillaume.** 1955. "Le commerce des vins et des eaux-de-vie en Languedoc sous l'Ancien régime." PhD diss. Université de Montpellier. 2

**Geys, Benny.** 2017. "Political Dynasties, Electoral Institutions and Politicians' Human Capital." *The Economic Journal*, 127(605): F474–F494. 6

**Glineur, Cédric.** 2013. *La transition administrative au XVII$^{e}$ siècle. Les instructions de l'intendant Le Peletier de Souzy à son successeur en Flandre wallonne (1683).* Éditions du CTHS. 14, 15

**Goldstone, Jack A.** 2012. "Demography." *The Oxford Handbook of the Ancien Régime*, , ed. William Doyle, 201–218. Oxford University Press. 9

**Goudot, Grégory.** 2006. "Monachisme clunisien et vie rurale sous l'Ancien Régime." *Histoire & Sociétés Rurales*, 25(1): 9–35. 17, 18

**Goy, Joseph, and Emmanuel Le Roy Ladurie.** 1982. *Prestations paysannes, dîmes, rente foncière et mouvement de la production agricole à l'époque préindustrielle.* Éditions de l'École des Hautes Études en Sciences Sociales. 10, 25

**Grantham, George W.** 2007. "What's Space Got to Do with it. Distance and Agricultural Productivity Before the Railway Age." *Paper prepared for the 67th Annual Meetings of the Economic History Society, September 7–9, 2007*. 10

**Greif, Avner, and Murat Iyigun.** 2013. "What Did the Old Poor Law Really Accomplish? A Redux." Working Papers 7398. 7

**Grenier, Jean Yves.** 1996. "Vaches maigres, vaches grasses. Une reconstitution des données agroclimatiques en France du Nord (1758–1789)." *Histoire & Sociétés Rurales*, 6(2): 77–94. 9, 11, 52, 53

**Gricourt, Mary-Claude.** 1963. "Étude d'Histoire démographique, sociale et religieuse de 5 paroisses de l'archidiaconé du Petit Caux : Doudeville, Canville, Bacqueville, Brachy et Luneray (du milieu du XVII$^{e}$ siècle à la fin de l'Ancien Régime)." *Cahier des Annales de Normandie*, (3): 445–553. 19

**Gruder, Vivian R.** 1968. *The Royal Provincial Intendants: A Governing Elite in Eighteenth-Century France.* Cornell University Press. 12, 13

**Guillot, Philippe.** 1963. "Étude économique et sociale du front de côte entre Orne et Seulles." *Cahier des Annales de Normandie*, (3): 275–441. 36

**Hamscher, Albert N.** 2012. *The Royal Financial Administration and the Prosecution of Crime in France, 1670–1789.* University of Delaware Press. 15

**Hayo, Bernd, and Florian Neumeier.** 2014. "Political Leaders' Socioeconomic Background and Fiscal Performance in Germany." *European Journal of Political Economy*, 34: 184–205. 5

**Hendrix, Cullen S., and Idean Salehyan.** 2012. "Climate Change, Rainfall, and Social Conflict in Africa." *Journal of Peace Research*, 49(1): 35–50. 21

**Hickey, Daniel.** 1997. *Local Hospitals in Ancien Régime France: Rationalization, Resistance, Renewal, 1530–1789.* McGill-Queen's Press-MQUP. 17

**Hoffman, Philip T.** 2000. *Growth in a Traditional Society: The French Countryside, 1450–1815.* Princeton University Press. 8, 10

**Hoffman, Philip T.** 2006. "The Church in Economy and Society." *The Cambridge History of Christianity: Enlightment, Reawakening and Revolution 1660–1815*, , ed. Stewart J. Brown and Thimothy Tackett, Chapter 4, 72–88. Cambridge University Press. 18, 36

**Hsiang, Solomon M., Marshall Burke, and Edward Miguel.** 2013. "Quantifying the Influence of Climate on Human Conflict." *Science*, 341(6151): 1235367. 23

**Hufton, Olwen H.** 1974. *The Poor of Eighteenth-Century France 1750–1789.* Oxford University Press. 17, 18

**Hufton, Olwen H.** 1983. "Social Conflict and the Grain Supply in Eighteenth-Century France." *The Journal of Interdisciplinary History*, 14(2): 303–331. 8, 18

**Hung, Ho-fung.** 2009. "Cultural Strategies and the Political Economy of Protest in Mid-Qing China." *Social Science History*, 33(1): 75–115. 7

**Hurpin, Gérard.** 1984. *L'intendance de Rouen en 1698.* C.T.H.S. 26

**Iyigun, Murat, Nathan Nunn, and Nancy Qian.** 2017. "The Long-run Effects of Agricultural Productivity on Conflict, 1400–1900." National Bureau of Economic Research Working Papers 24066. 6

**Jedwab, Remi, Noel D. Johnson, and Mark Koyama.** 2017. "Negative Shocks and Mass Persecutions: Evidence from the Black Death." The George Washington University, Institute for International Economic Policy Working Papers 2017-4. 6

**Jia, Ruixue.** 2014. "Weather Shocks, Sweet Potatoes and Peasant Revolts in Historical China." *The Economic Journal*, 124(575): 92–118. 6, 30

**Johnson, Noel D., and Mark Koyama.** 2017. "States and Economic Growth: Capacity and Constraints." *Explorations in Economic History*, 64: 1–20. 12

**Jones, Benjamin F., and Benjamin A. Olken.** 2005. "Do Leaders Matter? National Leadership and Growth since World War II." *Quarterly Journal of Economics*, 120(3): 835–864. 5

**Jones, Peter M.** 2012. "Agriculture." *The Oxford Handbook of the Ancien Régime*, , ed. William Doyle, 236–251. Oxford University Press. 8

**Jordan, Luke, Sébastien Turban, and Laurence Wilse-Samson.** 2013. "Learning Within the State: a Research Agenda." Columbia Universtiy. 5

**Jourdain, Sylvie, Émeline Roucaute, Philippe Dandin, Jean-Pierre Javelle, Isabelle Donet, Sylvia Ménassère, and Nadine Cénac.** 2015. "Le sauvetage de données climatologiques anciennes à Météo-France. De la conservation des documents à la mise à disposition des données." *La Météorologie*, 89: 47–55. 24, 52

**Kaplan, Steven L.** 1982. "The Famine Plot Persuasion in Eighteenth-Century France." *Transactions of the American Philosophical Society*, 72(3): 1–79. 19

**Kaplan, Steven L.** 1996. *The Bakers of Paris and the Bread Question, 1700–1775.* Duke University Press. 29

**Krieger, Moritz, Gerrit Lohmann, and Thomas Laepple.** 2011. "Seasonal Climate Impacts on the Grape Harvest Date in Burgundy (France)." *Climate of the Past*, 7(2): 425–435. 24

**Kung, James Kai-Sing, and Chicheng Ma.** 2014. "Can Cultural Norms Reduce Conflicts? Confucianism and Peasant Rebellions in Qing China." *Journal of Development Economics*, 111: 132–149. 6

**Labbé, Thomas, Christian Pfister, Stefan Brönnimann, Daniel Rousseau, Jörg Franke, and Benjamin Bois.** 2019. "The Longest Homogeneous Series of Grape Harvest Dates, Beaune 1354–2018, and its Significance for the Understanding of Past and Present Climate Discussions." *Climate of the Past*, 1–33. 24

**Labrousse, Ernest.** 1931. "Le prix du blé en France dans la seconde moitié du XVIII$^{e}$ siècle d'après les états statistique du contrôle général." *Revue d'histoire économique et sociale*, 19(2): 133–211. 11

**Labrousse, Ernest.** 1933. *Esquisse du mouvement des prix et des revenus en France au XVIII$^{e}$ siècle.* Dalloz. 26

**Lachiver, Marcel.** 1991. *Les années de misère: La famine au temps du Grand Roi, 1680–1720.* Fayard. 9

**Ladurie, Emmanuel Le Roy, Jacques Berchtold, and Jean-Paul Sermain.** 2007. *L'événement climatique et ses représentations, XVII$^{e}$–XIX$^{e}$ siècle : Histoire, littérature, musique et peinture.* Desjonquères. 7

**Langer, Simon M., C. Friedrich H. Longin, and Tobias Würschum.** 2014. "Flowering Time Control in European Winter Wheat." *Frontiers in Plant Science*, 5: 537. 9

**Lebrun, François.** 1971. "Les intendants de Tours et d'Orléans aux XVII$^{e}$ et XVIII$^{e}$ siècles." *Annales de Bretagne et des pays de l'Ouest*, 78(2): 287–305. 13, 24, 34

**Lefebvre, Georges.** 1972. *Les paysans du Nord pendant la Révolution française.* Armand Colin. 4, 18, 36

**Legay, Marie-Laure.** 2013. "Le financement et la gestion des dépôts de mendicité, France, 1764–1790." *Assistenza e solidarietà in Europa, secc. XIII-XVIII*, , ed. Francesco Ammannati, 333–345. Firenze University Press. 17

**Le Goff, Tim J. A., and Donald M. G. Sutherland.** 2000. "What Can we Learn from Leases? A Preliminary View." *Histoire & Mesure*, 15(3-4): 289–320. 10

**Lemarchand, Guy.** 1965. "Le temporel et les revenus de l'abbaye de Fécamp pendant le XVII$^{e}$ et le XVIII$^{e}$ siècles." *Annales de Normandie*, 15(15): 525–549. 18

**Lemarchand, Guy.** 1989. *La fin du féodalisme dans le pays de Caux. Conjoncture économique et démographique et structure sociale dans une région de grande culture : de la crise du XVII^e siècle à la stabilisation de la Révolution (1640–1795).* Éditions du CTHS. 18, 19, 36

**Lemarchand, Guy.** 1990. "Troubles populaires au XVIII^e siècle et conscience de classe : une préface à la Révolution française." *Annales historiques de la Révolution française*, 279(1): 32–48. 7

**Lepetit, Bernard.** 1988. "Carte des Généralités, Subdélégations et Élections en France à la veille de la Révolution de 1789 par Guy Arbellot, Jean-Pierre Goubert, Jacques Mallet, Yvette Palazot." *Annales. Économies, Sociétés, Civilisations*, 43(1): 120–121. 19

**Le Roy Ladurie, Emmanuel.** 1960. "Climat et récoltes : Aux XVII^e et XVIII^e siècles." *Annales. Histoire, Sciences Sociales*, 15(3): 434–465. 7

**Le Roy Ladurie, Emmanuel.** 1974. "Rèvoltes et contestations rurales en France de 1675 à 1788." *Annales. Économies, Sociétés, Civilisations*, 29(1): 6–22. 4, 7

**Le Roy Ladurie, Emmanuel.** 2006. *Histoire humaine et comparée du climat. Disettes et révolutions (1740–1860).* Fayard. 4, 7, 9

**Le Roy Ladurie, Emmanuel.** 2015. *Les Paysans français d'Ancien Régime.* Le Seuil. 8

**Leymarie, Michel.** 1956. "Émigration et structure sociale en Haute-Auvergne à la fin du XVIII^e siècle." *Revue de la Haute-Auvergne*, 35: 296–323. 10

**L'Héritier, Michel.** 1920. "Tourny. Intendant de Bordeaux." PhD diss. Université de Paris.

**Luterbacher, Jürg, Daniel Dietrich, Elena Xoplaki, Martin Grosjean, and Heinz Wanner.** 2004. "European Seasonal and Annual Temperature Variability, Trends, and Extremes since 1500." *Science*, 303(5663): 1499–1503. 23, 24

**Mäkinen, H., J. Kaseva, M. Trnka, J. Balek, K.C. Kersebaum, C. Nendel, A. Gobin, Jorgen Eivind Olesen, M. Bindi, R. Ferrise, et al.** 2018. "Sensitivity of European wheat to extreme weather." *Field Crops Research*, 222: 209–217. 9

**Maneuvrier-Hervieu, Paul.** 2015*a*. "Les grains de la colère. Le Pays de Caux dans la « guerre du blé » : approche sociologique et politique." Master's diss. Université de Caen–Normandie. 22

**Maneuvrier-Hervieu, Paul.** 2015*b*. "Les Normands dans la « Guerre du blé »au XVIII^e siècle." 175–183. FSHAN. 22

**Manning, Joseph G., Francis Ludlow, Alexander R. Stine, William R. Boos, Michael Sigl, and Jennifer R. Marlon.** 2017. "Volcanic Suppression of Nile Summer Flooding Triggers Revolt and Constrains Interstate Conflict in Ancient Egypt." *Nature communications*, 8(1): 900. 2

**Mannix, Liam.** 2018. "The Catholic Agricultural Enlightment in France." PhD diss. University of Chicago. 17, 18

**Marion, Henri.** 1974. *La dîme ecclésiastique en France au XVIII^e siècle et sa suppression.* Slatkine-Megariotis Reprints. 18, 19

**Markoff, John.** 1990. "Peasants Protest: The Claims of Lord, Church, and State in the Cahiers de Doleances of 1789." *Comparative studies in society and history*, 32(3): 413–454. 19

**Markovitch, Tihomir J.** 1976. *Histoire des Industries françaises : Les industries lainières de Colbert à la Révolution.* Librairie Droz. 8

**McCloy, Shelby Thomas.** 1946. *Government Assistance in Eighteenth-Century France.* Duke University Press. 15

**McManners, John.** 1960. *French Ecclesiastical Society Under the Ancien Régime: A Study of Angers in the Eighteenth Century.* Manchester University Press. 18

**McManners, John.** 1998. *Church and Society in Eighteenth-Century France: The Clerical Establishment and Its Social Ramification.* Vol. 1, Oxford: Clarendon Press. 17, 18

**McMichael, Anthony J.** 2012. "Insights from Past Millennia into Climatic Impacts on Human Health and Survival." *Proceedings of the National Academy of Sciences*, 109(13): 4730–4737. 2

**Mehlum, Halvor, Edward Miguel, and Ragnar Torvik.** 2006. "Poverty and Crime in 19th Ccentury Germany." *Journal of Urban Economics*, 59(3): 370–388. 6

**Michel, Louis.** 1979. "La dîme et les revenus du clergé d'Anjou à la fin de l'Ancien Régime." *Annales de Bretagne et des pays de l'Ouest*, 86(4): 565–605. 18

**Miguel, Edward, and Shanker Satyanath.** 2011. "Re-examining Economic Shocks and Civil Conflict." *American Economic Journal: Applied Economics*, 3(4): 228–232. 10

**Miller, Judith A.** 1992. "Politics and Urban Provisioning Crises: Bakers, Police, and Parlements in France, 1750–1793." *The Journal of Modern History*, 64(2): 227–262. 17

**Miller, Judith A.** 1999. *Mastering the Market: The State and the Grain Trade in Northern France, 1700–1860.* Cambridge University Press. 15, 31

**Miller, Stephen J.** 2009. "The Economy of France in the Eighteenth and Nineteenth Centuries: Market Opportunity and Labour Productivity in Languedoc." *Rural History*, 20(01): 1–30. 10

**Moessinger, Marc-Daniel.** 2014. "Do the Personal Characteristics of Finance Ministers Affect Changes in Public Debt?" *Public choice*, 161(1–2): 183–207. 6

**Molinier, Alain.** 1968. *Une paroisse du bas Languedoc : Sérignan, 1650–1792. Mémoires de la Société archéologique de Montpellier, tome XII*, Montpellier : Imprimerie Déhan. 2

**Molinier, Alain.** 1984. "Niveau d'instruction dans le Vivarais rural protestant XVII$^{e}$-début du XIX$^{e}$ siècle." *Bulletin de la Société de l'Histoire du Protestantisme Français*, 130(1): 47–68. 35

**Molinier, Alain.** 1985. *Stagnations et croissance : le Vivarais aux XVII$^{e}$–XVIII$^{e}$ siècle.* Éditions de l'École des Hautes Études en Sciences Sociales. 9, 1

**Morineau, Marcel.** 1970. "La pomme de terre au XVIII$^{e}$ siècle." *Annales. Économies, Sociétés, Civilisations*, 25(6): 1767–1785. 9

**Musset, Benoît.** 2011. "Les grandes exploitations viticoles de Champagne (1650–1830)." *Histoire & Sociétés Rurales*, 35(1): 79–98. 10

**Nassiet, Michel.** 1998. "La diffusion du blè noir en France à l'époque moderne." *Histoire & Sociétés Rurales*, 9(1): 57–76. 9

**Nicolas, Jean.** 2002. *La rébellion française. Mouvements populaires et conscience sociale (1661–1789).* Gallimard. 4, 7, 11, 20, 22, 27, 32, 1

**Nicolas, Sylvie.** 1998. *Les derniers maîtres des requêtes de l'Ancien Régime (1771–1789) : dictionnaire prosopographique.* École Nationale des Chartes. 13

**Nunn, Nathan, and Nancy Qian.** 2011. "The Potato's Contribution to Population and Urbanization: Evidence From a Historical Experiment." *Quarterly Journal of Economics*, 126(2): 593–650. 9

**Ó Gráda, Cormac, and Jean-Michel Chevet.** 2002. "Famine and Market in Ancien Régime France." *Journal of Economic History*, 62(3): 706–733. 11

**Oster, Emily.** 2004. "Witchcraft, Weather and Economic Growth in Renaissance Europe." *The Journal of Economic Perspectives*, 18(1): 215–228. 6

**Ouellet, Marie-Ève.** 2014. "Et ferez justice : le métier d'intendant au Canada et dans les généralités de Bretagne et de Tours au 18e siècle (1700–1750)." PhD diss. Université Rennes 2. 24

**Papaioannou, Kostadis J.** 2016. "Climate Shocks and Conflict: Evidence from Colonial Nigeria." *Political Geography*, 50: 33–47. 6

**Parker, David.** 2002. *Class and State in Ancien Régime France: The Road to Modernity?* Routledge. 8

**Pauling, Andreas, Jürg Luterbacher, Carlo Casty, and Heinz Wanner.** 2006. "Five Hundred Years of Gridded High-Resolution Precipitation Reconstructions over Europe and the Connection to Large-Scale Circulation." *Climate Dynamics*, 26(4): 387–405. 23, 24

**Pei, Qing, and D Zhang.** 2014. "Long-Term Relationship between Climate Change and Nomadic Migration in Historical China." *Ecology and Society*, 19(2): 68–68. 6

**Pfister, Christian, Rudolf Brázdil, and Rüdiger Glaser.** 1999. "Climatic Variability in Sixteenth-Century Europe and its Social Dimension: A Synthesis." *Climatic Change*, 43(1): 5–53. 23

**Pichard, Georges, and émeline Roucaute.** 2014. "Sept siècles d'histoire hydroclimatique du Rhône d'Orange à la mer (1300–2000): climat, crues, inondations." *Revue Méditerranée*, (hors-série): 1–192. 9

**Pillorget, René.** 1975. *Les mouvements insurrectionnels de Provence entre 1596 et 1715.* Vol. 2, A. Pédone. 7

**Ponsot, Pierre.** 2005. "Les débuts du maïs en Bresse sous Henri IV." *Histoire & Sociétés Rurales*, 23(1): 117–136. 9

**Porchnev, Boris Fedorovich.** 1963. *Les soulèvements populaires en France de 1623 à 1648.* S.E.V.P.E.N. 7

**Raulin, Victor Félix.** 1864. "Observations pluviométriques faites dans le sud-ouest de la France (Aquitaine et Pyré né es) de 1714 à 1860." *Actes de l'Académie des sciences, belles-lettres et arts de Bordeaux*, 177–492. 53

**Raulin, Victor Félix.** 1874. *Observations pluviométriques faites dans la France méridionale (Sud-Ouest, Centre et Sud-Est) de 1704 à 1870.* Bordeaux : Veuve Chaumas. 53

**Ricommard, Jean.** 1934. *La lieutenance générale de police à Troyes au XVIIIe siècle.* Hachette. 3

**Rives, Jean.** 1976. *Dîme et société dans l'archevêché d'Auch au XVIIIe siècle.* Paris : Bibliothèque Nationale. 18

**Rochlitz, Michael, Vera Kulpina, Thomas Remington, and Andrei Yakovlev.** 2015. "Performance Incentives and Economic Growth: Regional Officials in Russia and China." *Eurasian Geography and Economics*, 56(4): 421–445. 5

**Root, Hilton L.** 1992. *Peasants and King in Burgundy: Agrarian Foundations of French Absolutism.* University of California Press. 15

**Rossi, Martín A.** 2017. "Self-Perpetuation of Political Power." *The Economic Journal*, 127(605): F455–F473. 6

**Roucaute, Émeline, George Pichard, Éric Faure, and Manuela Royer-Carenzi.** 2014. "Analysis of the Causes of Spawning of Large-Scale, Severe Malarial Epidemics and Their Rapid Total Extinction in Western Provence, Historically a Highly Endemic Region of France (1745–1850)." *Malaria journal*, 13(1): 72. 52, 53

**Rudé, George.** 1964. *The Crowd in History: A Study of Popular Disturbances in France and England, 1730–1848.* John Wiley & Sons, New York. 4

**Saugrain, Claude-Marin.** 1726. *Dictionnaire universel de la France ancienne et moderne et de la Nouvelle France.* Vol. 3, Paris : Saugrain. 20

**Sen, Amartya.** 1981. *Poverty and Famines: An Essay on Entitlement and Deprivation.* Oxford University Press. 11

**Smedley-Weill, Anette.** 1995. *Les intendants de Louis XIV.* Fayard. 13

**Squicciarini, Mara P., and Nico Voigtländer.** 2015. "Human Capital and Industrialization: Evidence from the Age of Enlightenment." *Quarterly Journal of Economics*, 130(4): 1825–1883. 36

**Swann, Julian.** 2001. "The State and Political Culture." *Old regime France 1648–1788. The Short Oxford History of France*, 1339–1368. Oxford University Press. 12

**Tilly, Louise A.** 1972. "La révolte frumentaire, forme de conflit politique en France." *Annales. Histoire, Sciences Sociales*, 27(3): 731–757. 7, 11

**Van Bavel, Bas, and Auke Rijpma.** 2016. "How Important were Formalized Charity and Social Spending before the Rise of the Welfare State? A Long-run Analysis of Selected Western European Cases, 1400–1850." *Economic History Review*, 69(1): 159–187. 7, 17

**Viton de Saint-Allais, Nicolas.** 1813. *La France législative, ministérielle, judiciaire et administrative sous les quatre dynastie.* Vol. 2, Paris : Imprimerie de P. Didot l'aîné. 24

**Vouette, Isabelle.** 2007. "Millet, panis, sarrasin, maïs et sorgho: Les menus grains dans les systèmes agricoles anciens (France, milieu du XVI$^{e}$ siècle-milieu du XIX$^{e}$ siècle)." PhD diss. Université Paris 7. 9

**Vovelle, Michel.** 1986. "Carte des Généralités, Subdélégations et Élections en France à la veille de la Révolution de 1789 par Guy Arbellot, Jean-Pierre Goubert, Jacques Mallet, Yvette Palazot." *Annales historiques de la Révolution française*, 264(1): 232–233. 19

**Waldinger, Maria.** 2014. "Drought and the French Revolution: The Effects of Adverse Weather Conditions on Peasant Revolts in 1789." 29, 2

**White, James W.** 1995. *Ikki: Social Conflict and Political Protest in Early Modern Japan.* Cornell University Press. 6

**Yao, Yang, and Muyang Zhang.** 2015. "Subnational Leaders and Economic Growth: Evidence from Chinese Cities." *Journal of Economic Growth*, 20(4): 405–436. 5

**Young, Arthur.** 1906. *Arthur Young's Travels in France During the Years 1787, 1788, 1789.* London: George Bell and Sons. 18

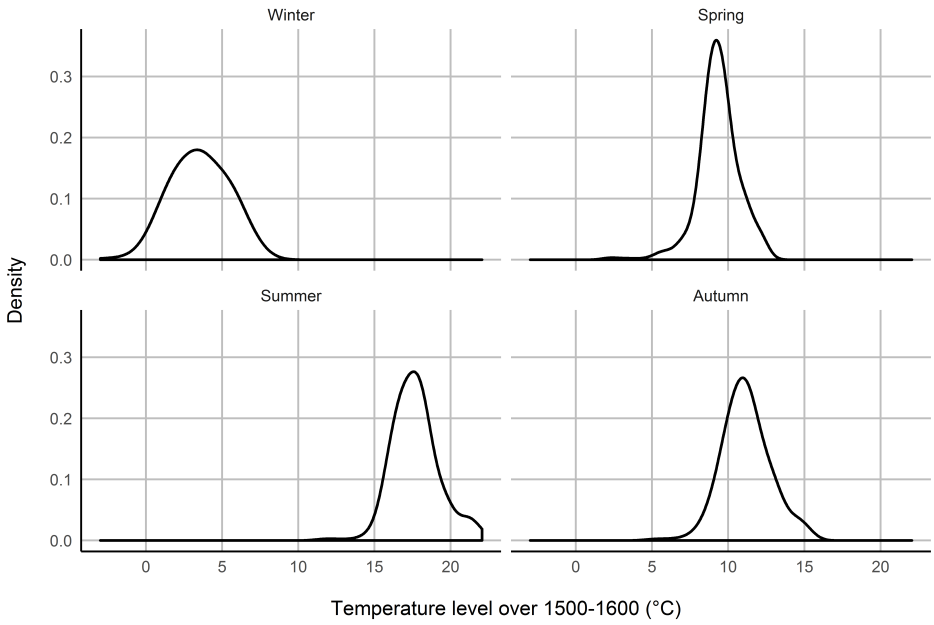



Figure 1: Distribution of seasonal temperature long-term means (1500–1600)

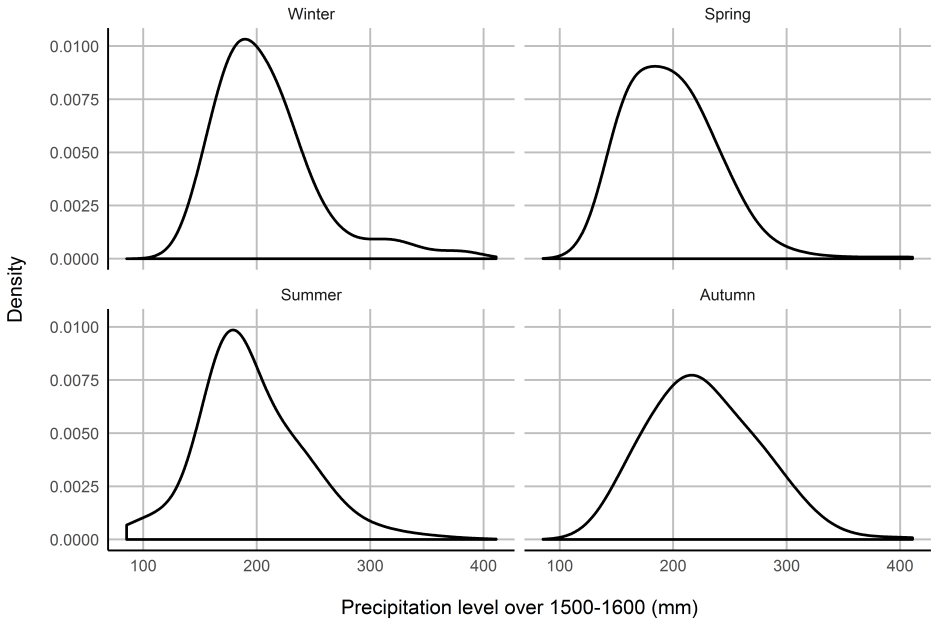



Figure 2: Distribution of seasonal precipitation long-term means (1500–1600)

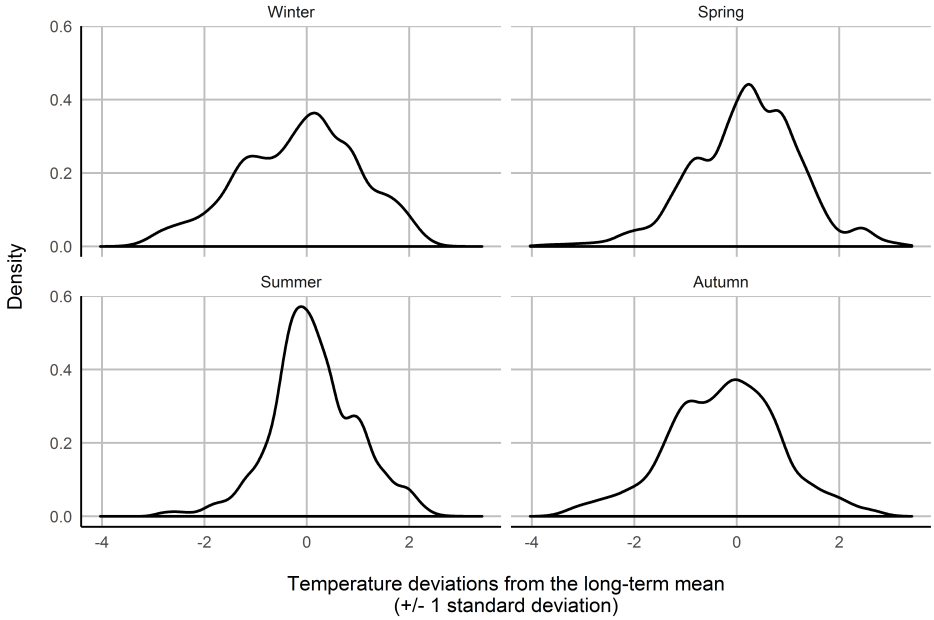



Figure 3: Distribution of seasonal temperature (1661–1789)

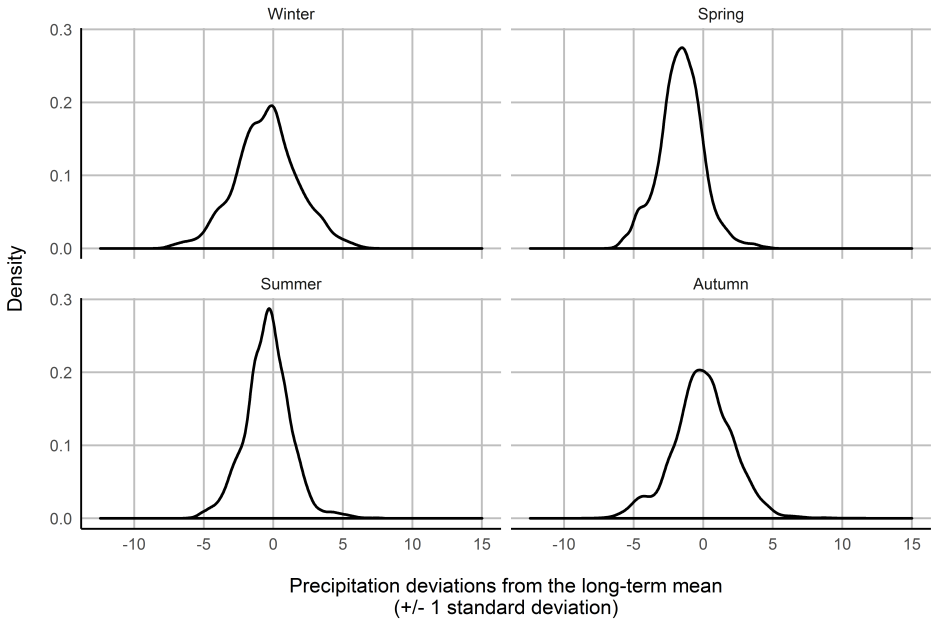
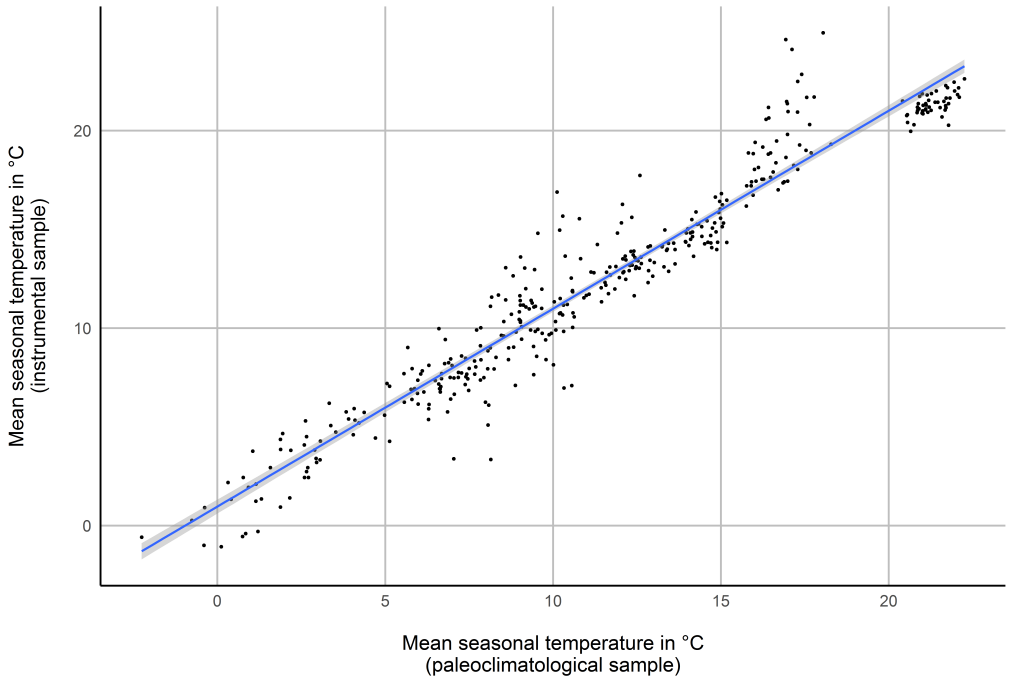
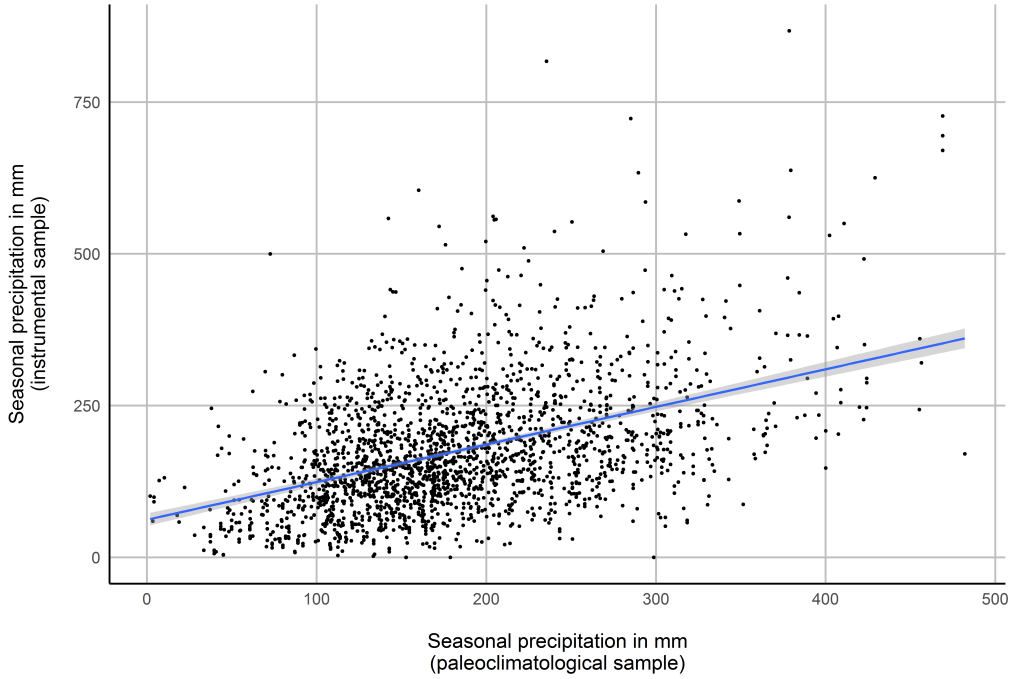



Figure 4: Distribution of seasonal precipitation (1661–1789)



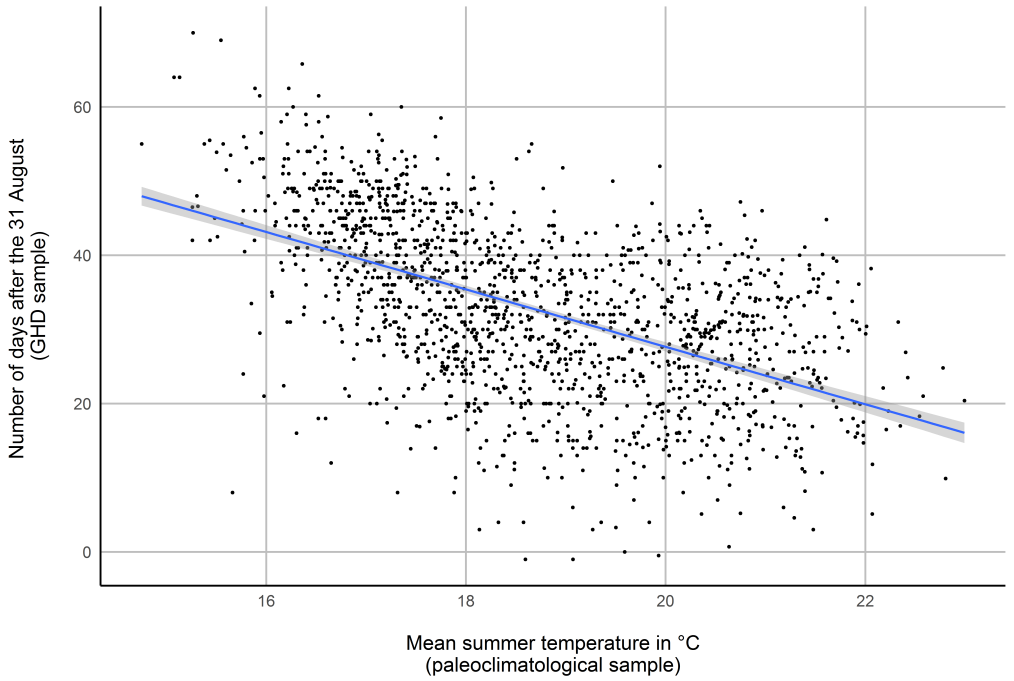

Notes: Arras, 1783–8 (Jourdain et al., 2015); Lille, 1758–90 (Grenier, 1996, p. 85); Marseille, 1745–92 (Roucaute et al., 2014); Saint-Dié-des-Vosges, 1786–91 (Jourdain et al., 2015); Saint-Malô, 1782–8 (Jourdain et al., 2015).

Figure 5: Correlation between paleoclimatological and instrumental temperature series (1745–92)




Notes: Aix-en-Provence, 1728–30 and 1776–7 (Raulin, 1874, p. 877); Arles, 1782–6 (Raulin, 1874, p. 873); Béziers, 1725–32 and 1782–6 (Raulin, 1874, p. 157); Bordeaux, 1714–86 (Raulin, 1864, pp. 217–8); Cardon-Blanc, 1729–70 (Raulin, 1864, p. 270); Cavaillon, 1785–6 (Raulin, 1874, p. 863); La Rochelle, 1777–93 (Raulin, 1864, p. 206); Lille, 1758–90 (Grenier, 1996, p. 87); Lyon, 1765–80 (Raulin, 1874, p. 80); Poitiers, 1778–1800 (Raulin, 1864, p. 188); Manosque, 1782–6 (Raulin, 1874, p. 852); Marans, 1783–6 (Raulin, 1864, p. 204); Marseille, 1748–1800 (Roucaute et al., 2014); Montpellier, 1765–1800 (Raulin, 1864, p. 343); Nîmes, 1746–55 and 1784–85 (Raulin, 1874, p. 138); Rieux, 1783–6 (Raulin, 1864, p. 296); Saint-Sever, 1782–96 (Raulin, 1864, p. 256); Toulon, 1739 and 1742–7 (Raulin, 1874, p. 890); Toulouse, 1750 and 1785–6 (Raulin, 1864, p. 292); Viviers, 1778–1800 (Raulin, 1874, p. 129).

Figure 6: Correlation between paleoclimatological and instrumental precipitation series (1714–92)




Notes: Grape harvest dates are derived from Daux et al. (2012).

Figure 7: Correlation between summer temperature reconstructions and grape harvest dates (1600–1800)

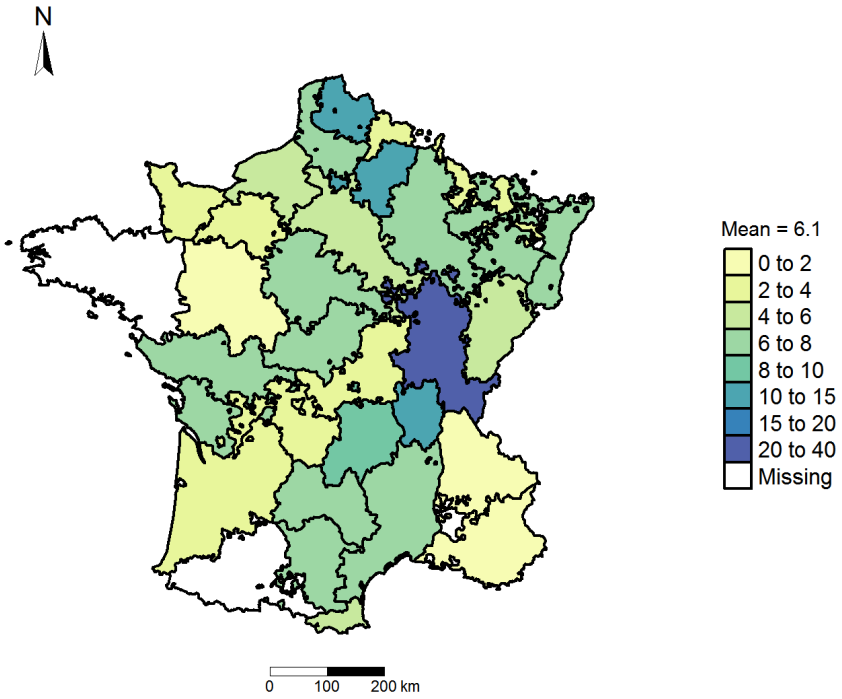



Figure 8: Number of years of intendants' local experience in 1680

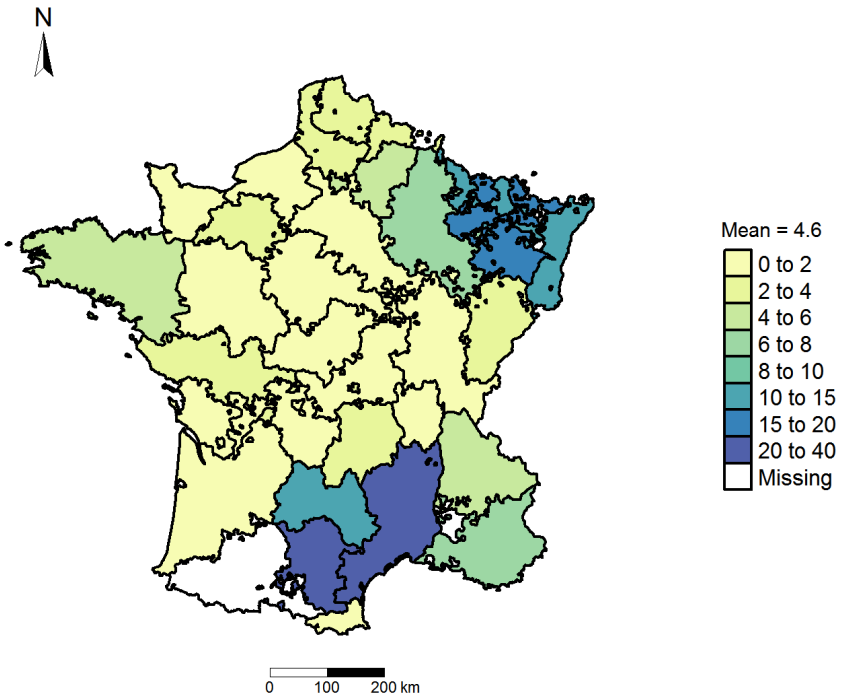



Figure 9: Number of years of intendants' local experience in 1710

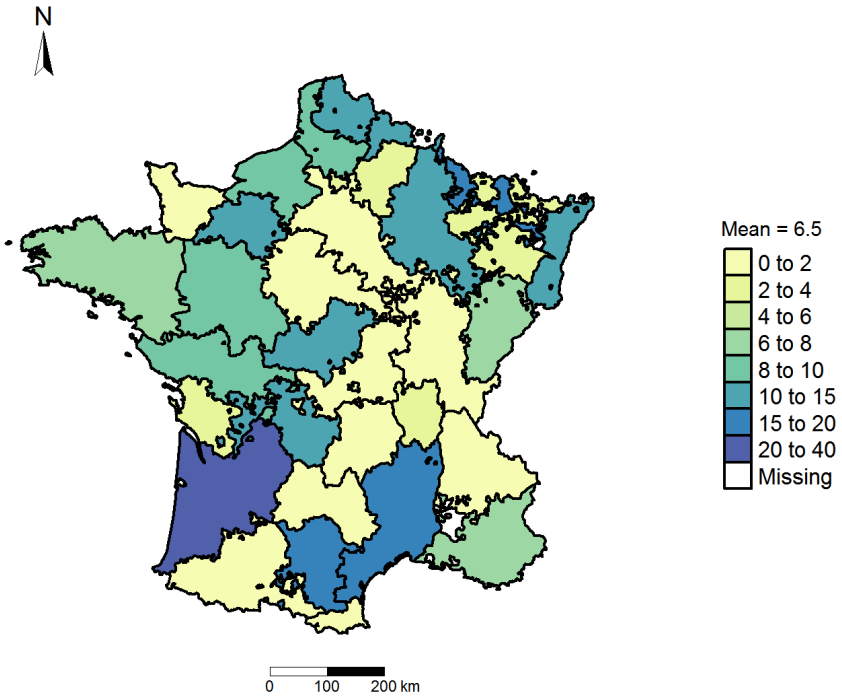



Figure 10: Number of years of intendants' local experience in 1740

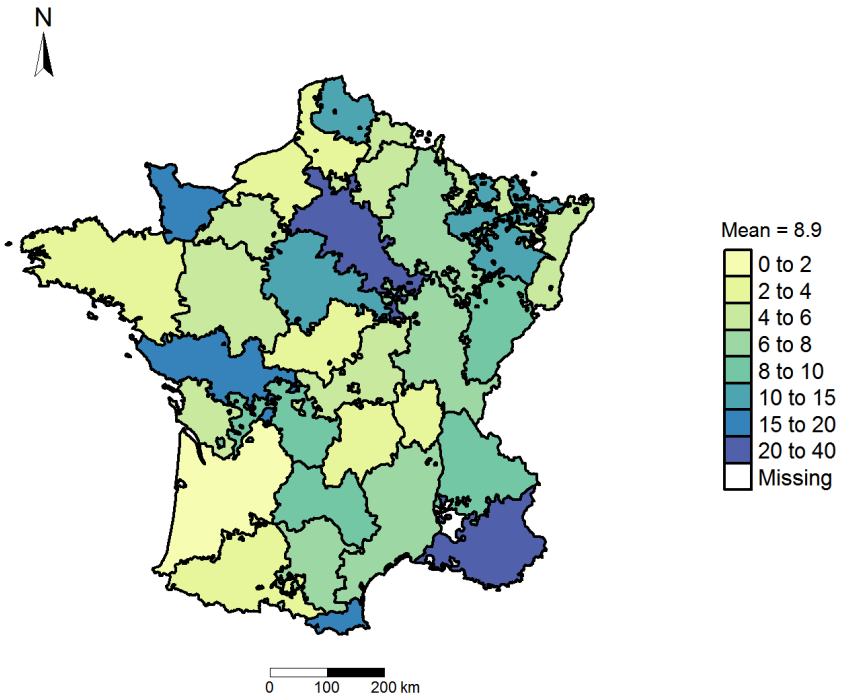



Figure 11: Number of years of intendants' local experience in 1770

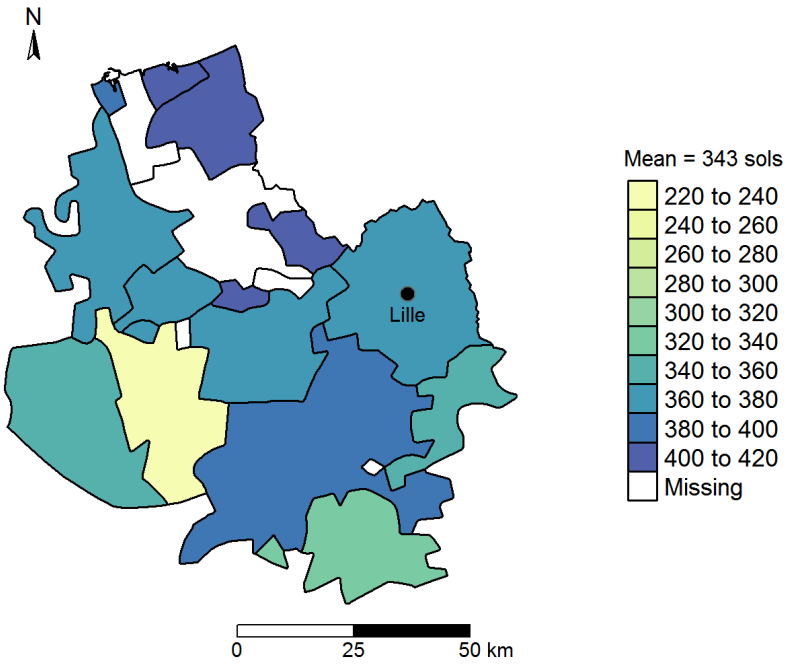



Figure 12: Wheat prices in the province of Flanders (1765)

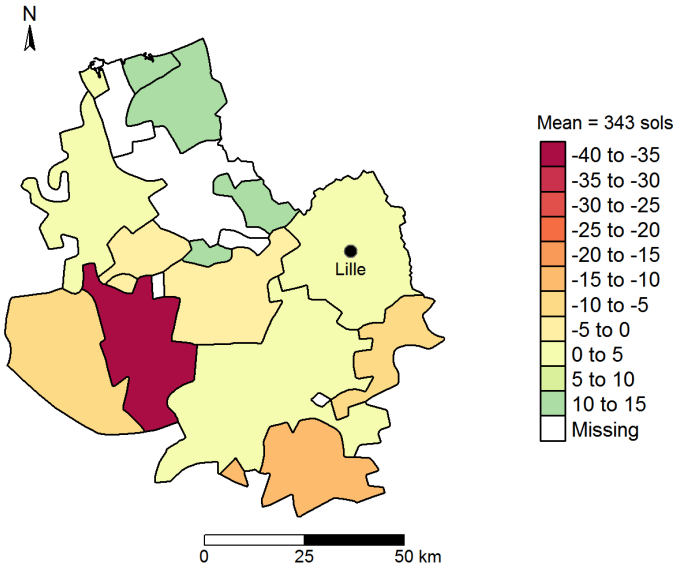



Figure 13: Variations of wheat prices (%) in the province of Flanders (1765)

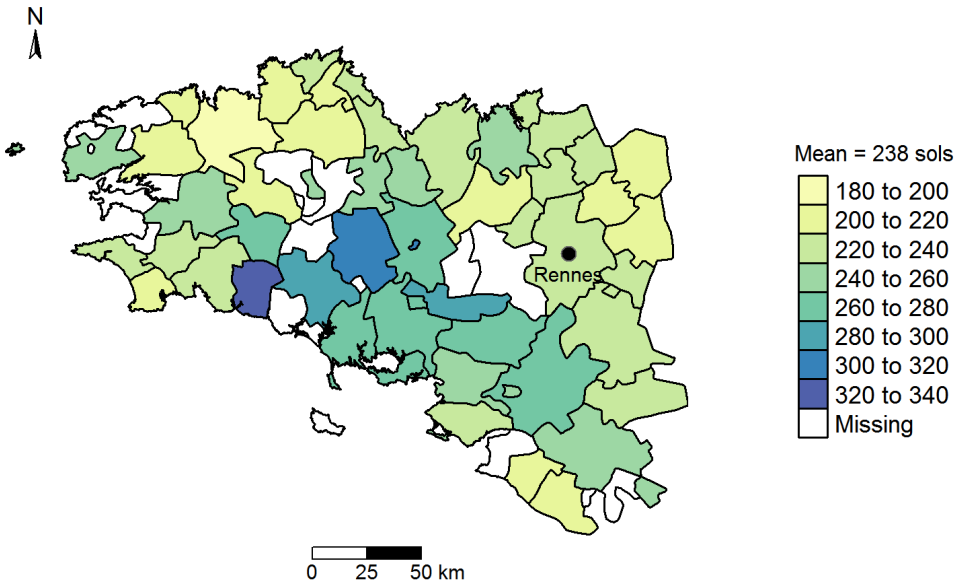



Figure 14: Wheat prices in the province of Brittany (1771)

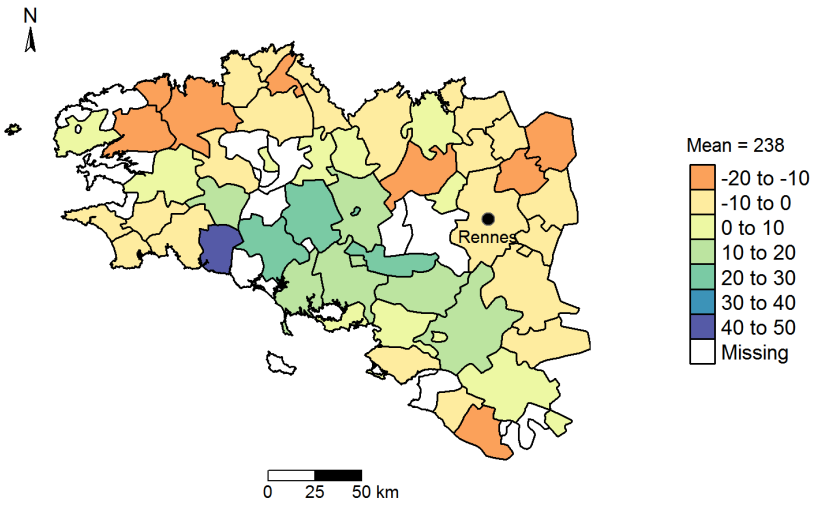



Figure 15: Variations of wheat prices (%) in the province of Brittany (1771)

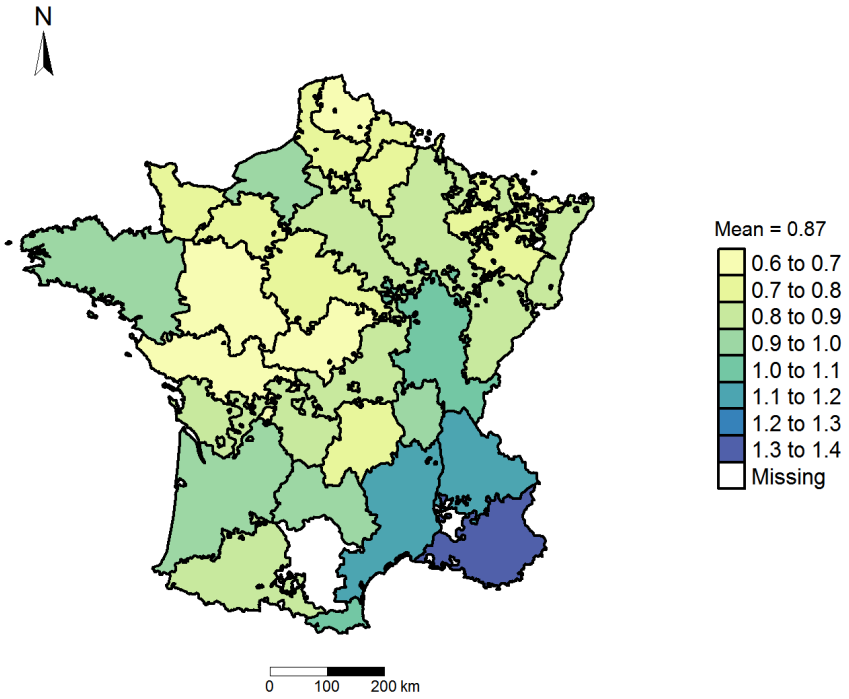



Figure 16: Wheat prices across French provinces in 1760

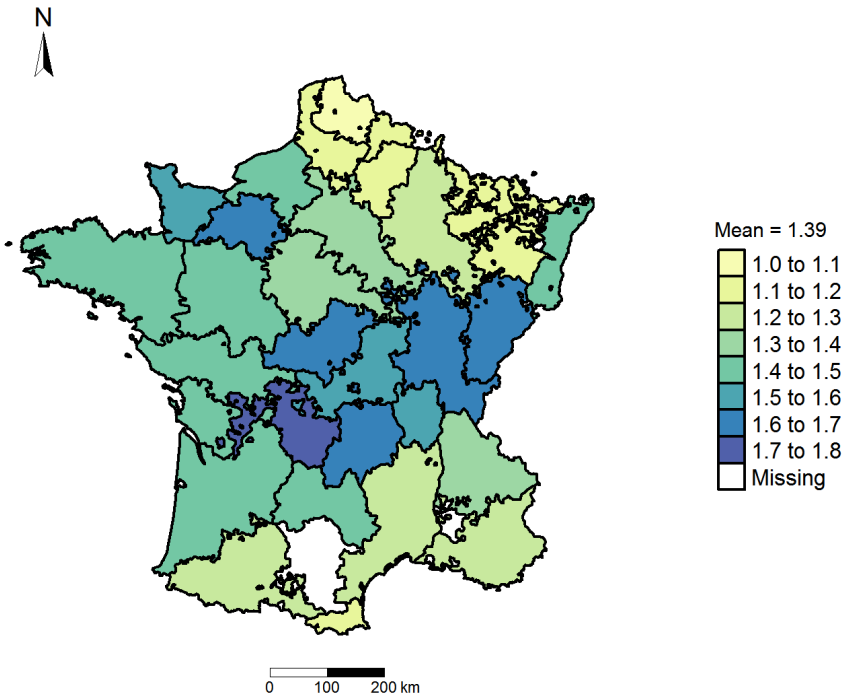



Figure 17: Wheat prices across French provinces in 1770

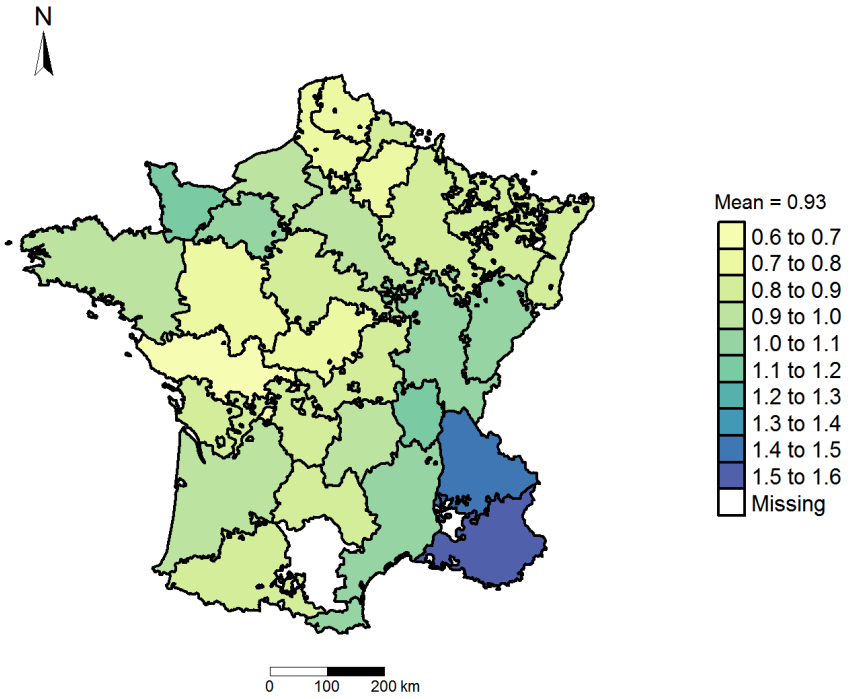



Figure 18: Wheat prices across French provinces in 1780

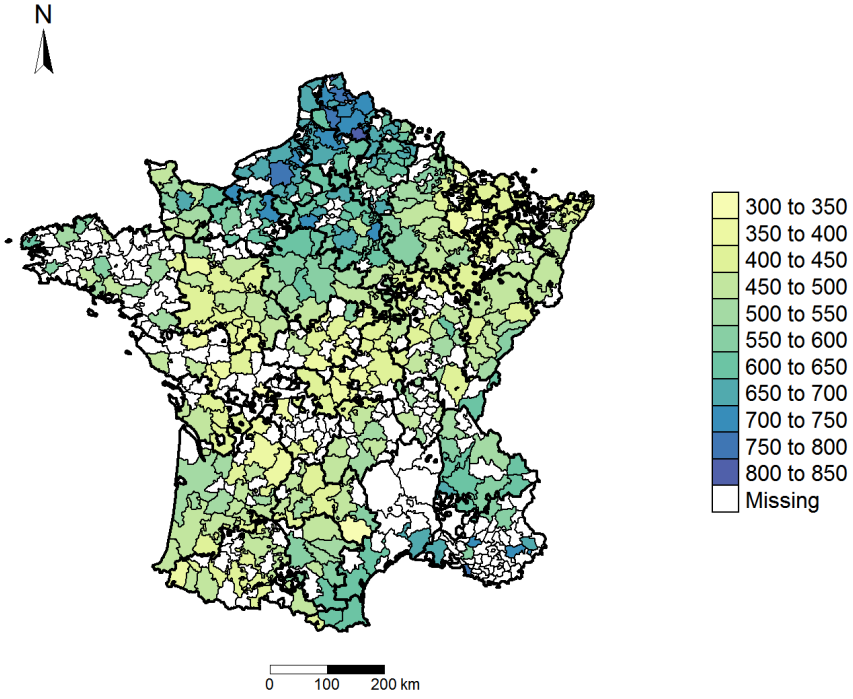



Figure 19: Wheat prices across French districts in 1768

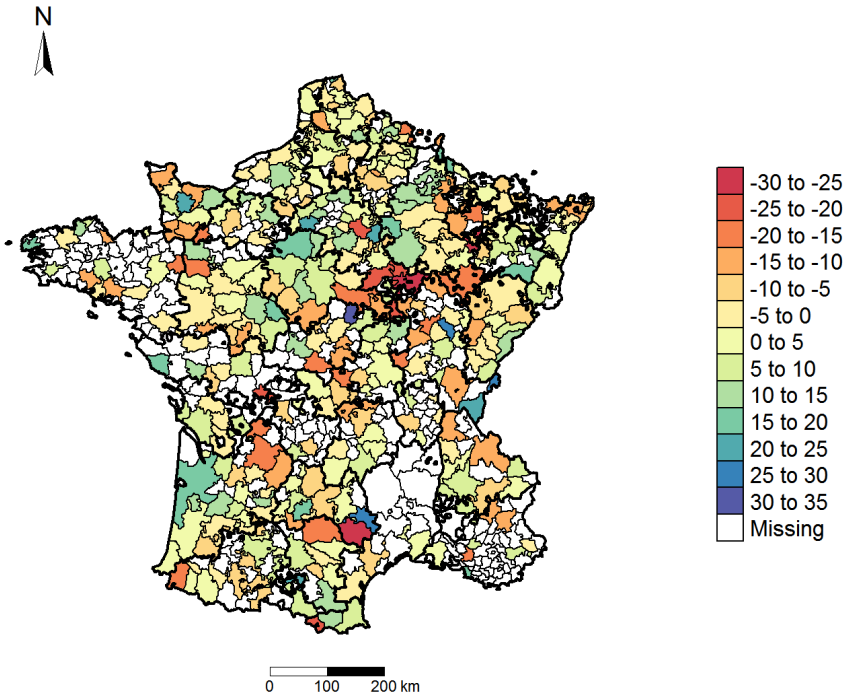



Figure 20: Variations of wheat prices (%) within French provinces in 1768

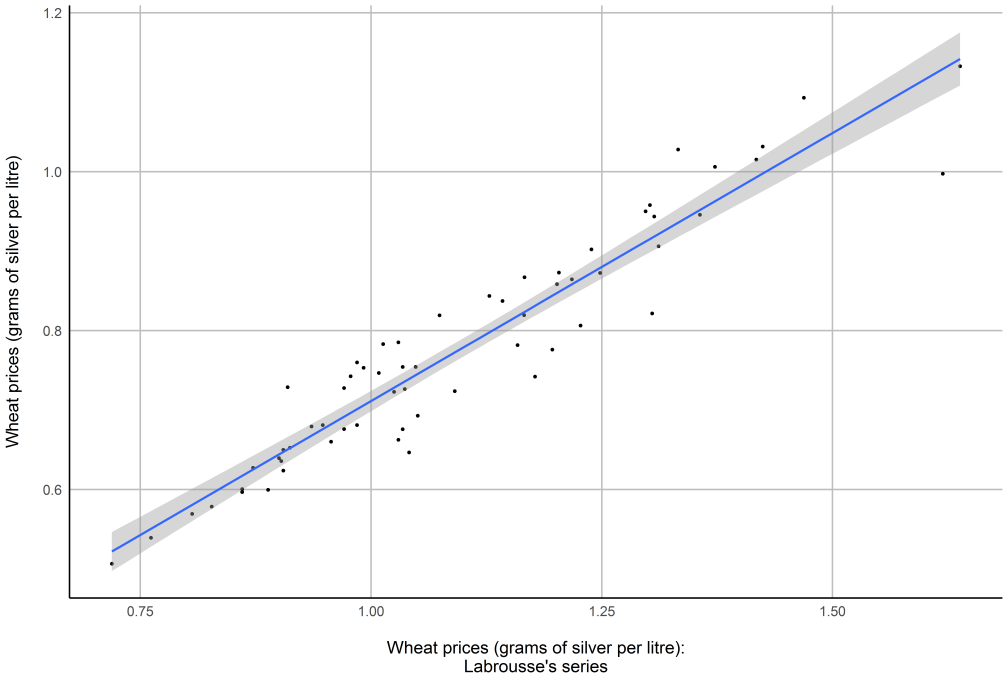



Figure 21: Correlation between prices samples at the level of provinces (1767–8)

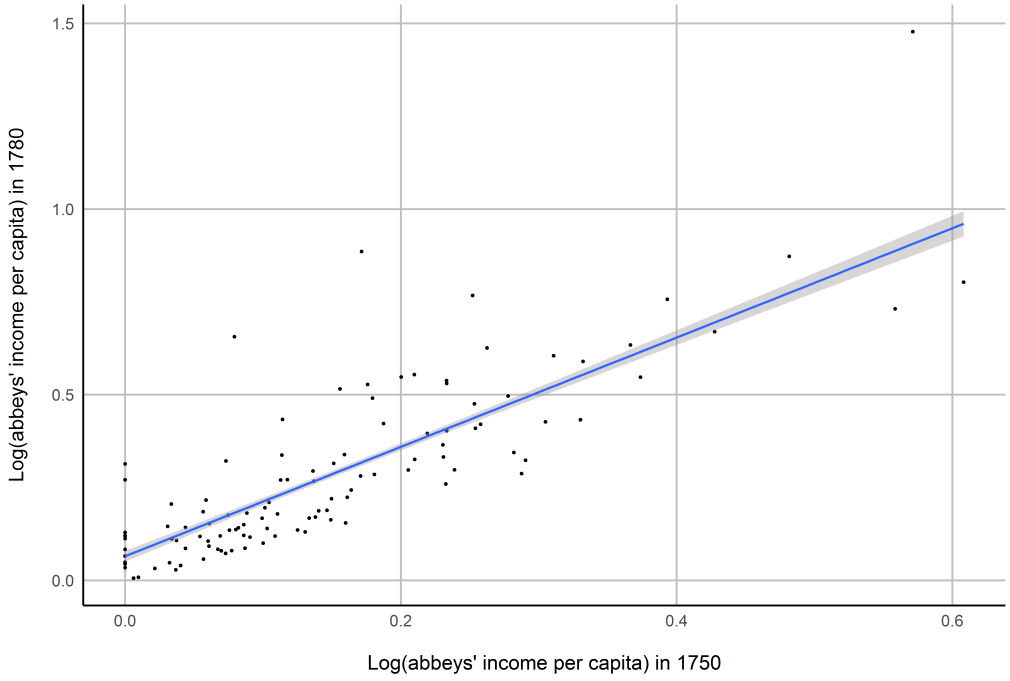



Figure 22: Correlation between abbeys' income per capita at the district level in 1750 and 1780

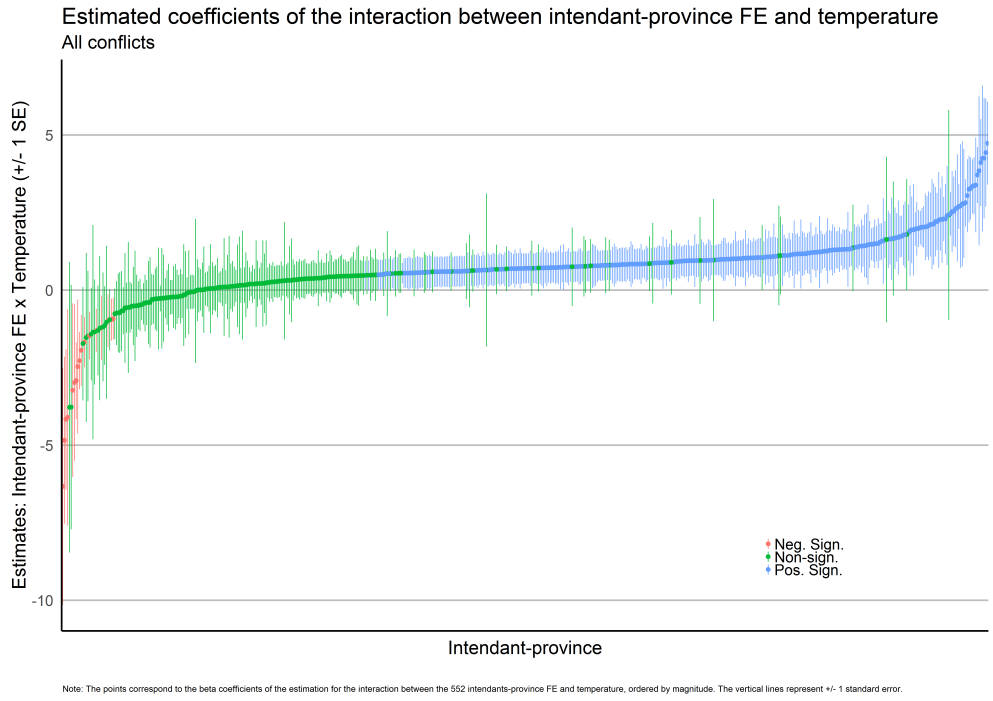



Figure 23: Estimated coefficients of intendant-province fixed effects on social conflicts

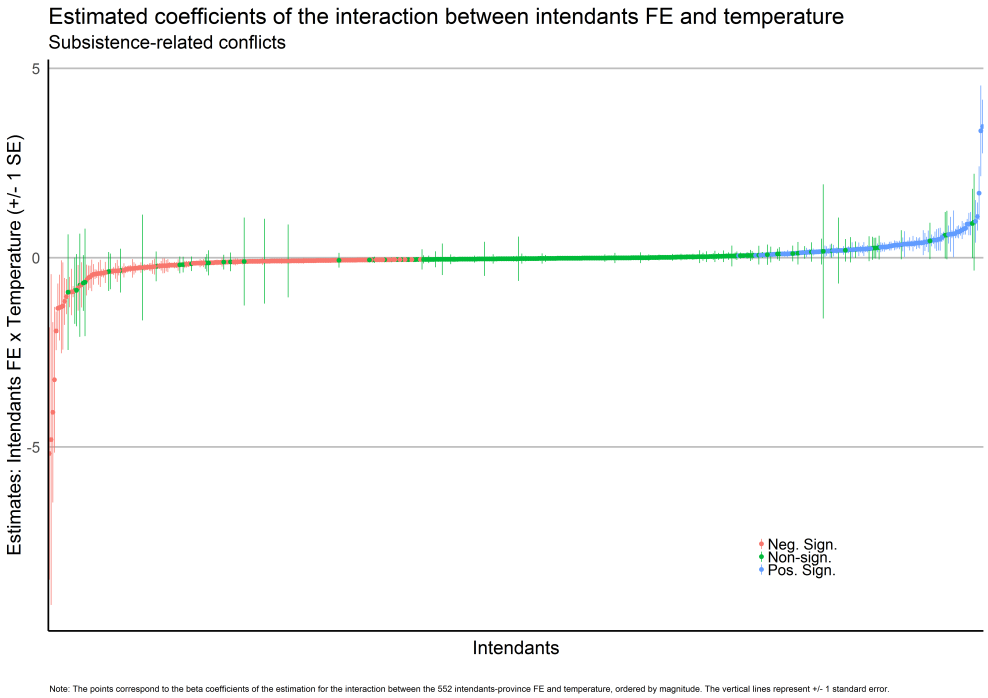
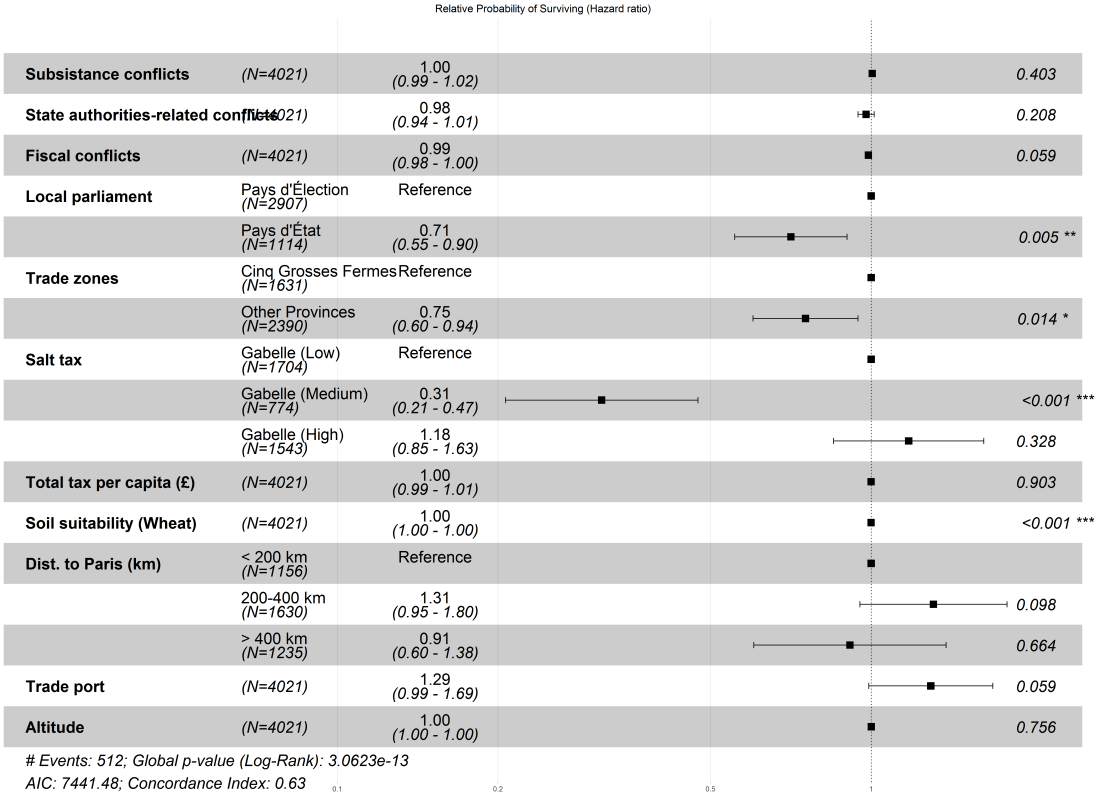



Figure 24: Estimated coefficients of intendant-province fixed effects on subsistence-related conflicts

# Figure 25: Determinants of intendants' survival




Notes: The figure reports the hazard ratio of 'ending tenure' for intendants. Thus, the dependent variable equals one if the intendant in province $j$ in year $t$ is different from the intendant in province $j$ in year $t+1$, and zero otherwise.
The explanatory variables are the total number of subsistence conflicts, fiscal conflicts, and state authorities-related conflicts in province $j$ over the past five years. Pays d'État is a dummy variable equal to one if the province $j$ had a local parliament, and zero otherwise. Outside CGF is a dummy variable equal to one if the province $j$ is outside the free trade zone (the so-called *Cinq Grandes Fermes*), and zero otherwise. Salt tax is a factor variable capturing the fact that the level of the *gabelle* province $j$ is low, medium or high in province $j$. Trade port is a dummy variable equal to one if there is at least one important trade port in province $j$, and zero otherwise. Dist. to Paris is a factor variable capturing the fact that the siege of province $j$ is less than 200 km, between 200 and 400 km, and more than 400 km away from Paris. Log(Soil suitability) is the log of average soil suitability for wheat (under low input and rain-fed conditions) in province $j$.

Table 1: Harvest failure and poor relief in Languedoc in 1773

| Parishes | Quantity of grains | | Price | Cash needed (£) | | Total (£) |
|---|---|---|---|---|---|---|
| | Cropping | Subsistence | | Cropping | Subsistence | |
| Mirevaux | 225 | 127 | 12 | 2,700 | 1,524 | 4,224 |
| Villeneuve | 96.5 | 58.5 | 12 | 1,158 | 702 | 1,860 |
| Gigean | 380.75 | 306.5 | 12 | 4,569 | 3,678 | 8,247 |
| Balaruc | 66.5 | 41 | 12 | 798 | 492 | 1,290 |
| Poussan | 488.75 | 220 | 12 | 5,865 | 2,640 | 8,505 |
| Total | 1,257 | 753 | 12 | 15,090 | 9,036 | 24,126 |

*Notes:* All quantities are expressed in *setier* of Montpellier, which is equal to 52.365 litres (4 *boisseaux* of Paris). Prices are given for one *setier* of wheat.
*Sources*: A.D. Hérault, C 5458.

Table 2: Summary statistics

| Statistic | N | Mean | St. Dev. | Min | Pctl(25) | Pctl(75) | Max |
|---|---|---|---|---|---|---|---|
| **Conflict data** | | | | | | | |
| Social conflicts | 353,970 | 1.87 | 13.53 | 0 | 0 | 0 | 100 |
| Subsistence conflicts | 353,970 | 0.28 | 5.28 | 0 | 0 | 0 | 100 |
| Fiscal conflicts | 353,970 | 0.80 | 8.89 | 0 | 0 | 0 | 100 |
| State authorities-related conflicts | 353,970 | 0.30 | 5.50 | 0 | 0 | 0 | 100 |
| Other conflicts | 353,970 | 0.40 | 6.33 | 0 | 0 | 0 | 100 |
| **Weather data** | | | | | | | |
| Temperature anomalies (winter) | 89,010 | -0.15 | 1.16 | -3.59 | -0.99 | 0.71 | 2.78 |
| Precipiation anomalies (winter) | 89,010 | -0.49 | 2.27 | -8.13 | -1.92 | 0.92 | 7.24 |
| Temperature anomalies (spring) | 88,320 | 0.19 | 1.04 | -4.03 | -0.47 | 0.87 | 3.42 |
| Precipiation anomalies (spring) | 88,320 | -1.59 | 1.60 | -6.72 | -2.54 | -0.62 | 4.91 |
| Temperature anomalies (summer) | 88,320 | 0.14 | 0.85 | -3.02 | -0.36 | 0.67 | 3.19 |
| Precipiation anomalies (summer) | 88,320 | -0.39 | 1.66 | -7.11 | -1.38 | 0.59 | 7.80 |
| Temperature anomalies (autumn) | 88,320 | -0.26 | 1.10 | -3.86 | -0.99 | 0.46 | 3.21 |
| Precipiation anomalies (autumn) | 88,320 | -0.01 | 2.19 | -12.44 | -1.28 | 1.37 | 15.01 |
| **Other data** | | | | | | | |
| Years of local experience | 85,386 | 6.5 | 6.9 | 0.0 | 2.0 | 9.0 | 44.0 |
| Years of prior experience | 85,386 | 3.4 | 5.3 | 0.0 | 0.0 | 5.0 | 28.0 |
| Local experience | 85,386 | 0.9 | 0.3 | 0.0 | 1.0 | 1.0 | 1.0 |
| Prior experience | 85,386 | 0.5 | 0.5 | 0.0 | 0.0 | 1.0 | 1.0 |
| Monasteries' income (1780) | 637 | 125,158 | 120,834 | 600 | 35,000 | 168,600 | 616,300 |
| Nobility index | 89,010 | 40 | 28 | 0 | 20 | 57 | 138 |
| Provincial wheat prices (1756–89) | 1,054 | 1.03 | 0.29 | 0.47 | 0.82 | 1.20 | 3.73 |
| District wheat prices (1767–8) | 708 | 0.77 | 0.16 | 0.43 | 0.66 | 0.87 | 1.31 |

Table 3: Temperature shocks and social conflicts in France (1661–1789)

| | Social conflicts | Subsistence conflicts | Fiscal conflicts | State authorities--related conflicts | Other conflicts |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| Temperature | 0.108*** | 0.052*** | 0.005 | 0.033*** | 0.010 |
| | (0.026) | (0.013) | (0.017) | (0.010) | (0.012) |
| District FE | Yes | Yes | Yes | Yes | Yes |
| Province × Year FE | Yes | Yes | Yes | Yes | Yes |
| Observations | 353,970 | 353,970 | 353,970 | 353,970 | 353,970 |
| Mean DV | 1.87 | 0.28 | 0.8 | 0.3 | 0.4 |

*Notes:* Significant at ***1%, **5%, *10%. LPM estimations. Conley (1999) standard errors in parentheses allowing for spatial correlation within a 100 km radius and for infinite serial correlation.
The dependent variable in column 1 equals 100 if at least one social conflict occurred in district $i$ in season $s$ in year $t$, and zero otherwise. In columns 2 to 5, the other dependent variables are defined accordingly for subsistence-related conflict, fiscal conflict, conflict against state authorities, and other types of conflict. The independent variable Temperature is the seasonal temperature deviation from the long-term seasonal mean (1500-1600) in district $i$, divided by its standard deviation. District FE is a full set of 690 district fixed effects. Province x Year FE is the interaction of province dummies with the full set of year fixed effects.

Table 4: Urban and rural social conflicts (1661-1789)

| | Social conflicts | | | Subsistence conflicts | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Temperature | 0.093*** | 0.099*** | 0.112*** | 0.063*** | 0.065*** | 0.060*** |
| | (0.026) | (0.026) | (0.026) | (0.013) | (0.013) | (0.013) |
| Temperature | 0.104 | | | −0.082* | | |
| × Urban | (0.089) | | | (0.049) | | |
| Temperature | | 0.091 | | | −0.144** | |
| × Urban. rate | | (0.114) | | | (0.065) | |
| Temperature | | | −0.087 | | | −0.179 |
| × Capital | | | (0.131) | | | (0.116) |
| District FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Province × Year FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 353,970 | 353,970 | 353,970 | 353,970 | 353,970 | 353,970 |

*Notes:* Significant at ***1%, **5%, *10%. LPM estimations. Conley (1999) standard errors in parentheses allowing for spatial correlation within a 100 km radius and for infinite serial correlation.
In columns 1 to 3, the dependent variable equals 100 if at least one social conflict occurred in district $i$ in season $s$ in year $t$, and zero otherwise. In columns 4 to 6, the dependent variable equals 100 if at least one subsistence conflict occurred in district $i$ in season $s$ in year $t$, and zero otherwise. The independent variable Temperature is the seasonal temperature deviation from the long-term seasonal mean (1500-1600) in district $i$, divided by its standard deviation. Urban is a dummy variable equal to one if district $i$ had at least one town larger than 10,000 inhabitants in 1789, and 0 otherwise. Urban rate is a dummy variable equal to one if the popluation share of district $i$ living in towns larger than 10,000 inhabitants in 1789 is above 20 per cent, and 0 otherwise. Capital is a dummy variable equal to one if the capital city of province $j$ is located in district $i$, and 0 otherwise. District FE is a full set of 690 district fixed effects. Province x Year FE is the interaction of province dummies with the full set of year fixed effects.

Table 5: Robustness checks: Large social conflicts (1661–1789)

| | Social conflicts | Subsistence conflicts | Fiscal conflicts | State authorities--related conflicts | Other conflicts |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| Temperature | 0.026** | 0.017*** | 0.012* | 0.004 | −0.001 |
| | (0.011) | (0.005) | (0.007) | (0.003) | (0.005) |
| District FE | Yes | Yes | Yes | Yes | Yes |
| Province × Year FE | Yes | Yes | Yes | Yes | Yes |
| Observations | 353,970 | 353,970 | 353,970 | 353,970 | 353,970 |
| Mean DV | 0.31 | 0.06 | 0.12 | 0.03 | 0.06 |

*Notes:* Significant at ***1%, **5%, *10%. LPM estimations. Conley (1999) standard errors in parentheses allowing for spatial correlation within a 100 km radius and for infinite serial correlation.
The dependent variable in column 1 equals 100 if at least one social conflict involving more than fifty individuals occurred in district $i$ in season $s$ in year $t$, and zero otherwise. In columns 2 to 5, the other dependent variables are defined accordingly for subsistence-related conflict, fiscal conflict, conflict against state authorities, and other types of conflict. The independent variable Temperature is the seasonal temperature deviation from the long-term seasonal mean (1500–1600) in district $i$, divided by its standard deviation. District FE is a full set of 690 district fixed effects. Province x Year FE is the interaction of province dummies with the full set of year fixed effects.

Table 6: Robustness checks: Alternative measures of temperature

| | Social conflicts | | | Subsistence conflicts | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Temperature median | 0.114*** | | | 0.052*** | | |
| | (0.026) | | | (0.013) | | |
| Temperature 50 MA | | 0.064** | | | 0.018 | |
| | | (0.027) | | | (0.012) | |
| Temperature level | | | 0.035*** | | | 0.008*** |
| | | | (0.005) | | | (0.002) |
| District FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Province × Year FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 353,970 | 353,970 | 353,970 | 353,970 | 353,970 | 353,970 |

*Notes:* Significant at ***1%, **5%, *10%. LPM estimations. Conley (1999) standard errors in parentheses allowing for spatial correlation within a 100 km radius and for infinite serial correlation.
In columns 1 to 3, the dependent variable equals 100 if at least one social conflict occurred in district $i$ in season $s$ in year $t$, and zero otherwise. In columns 4 to 6, the dependent variable equals 100 if at least subsistence conflict occurred in district $i$ in season $s$ in year $t$, and zero otherwise. The independent variable Temperature median is the seasonal temperature deviation from the long-term seasonal median (1500-1600) in district $i$, divided by its standard deviation. Temperature 50 MA is the seasonal temperature deviation from the 50 years moving average in district $i$, divided by its standard deviation. Temperature level is the average temperature in district $i$ in season $s$ in year $t$. District FE is a full set of 690 district fixed effects. Province x Year FE is the interaction of province dummies with the full set of year fixed effects.

Table 7: Robustness checks: Inclusion of additional weather variables

| | Social conflicts | | | Subsistence conflicts | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Temperature | 0.092*** | 0.099*** | 0.104*** | 0.037*** | 0.049*** | 0.047*** |
| | (0.026) | (0.026) | (0.026) | (0.012) | (0.013) | (0.013) |
| Temperature$^2$ | −0.054*** | | | −0.050*** | | |
| | (0.016) | | | (0.008) | | |
| Precipitation | | −0.037*** | | | −0.014** | |
| | | (0.012) | | | (0.007) | |
| Temperature *s-1* | | | −0.002 | | | −0.029* |
| | | | (0.030) | | | (0.017) |
| Temperature *s+1* | | | −0.028 | | | 0.016 |
| | | | (0.026) | | | (0.014) |
| District FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Province × Year FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 353,970 | 353,970 | 353,970 | 353,970 | 353,970 | 353,970 |

*Notes:* Significant at ***1%, **5%, *10%. LPM estimations. Conley (1999) standard errors in parentheses allowing for spatial correlation within a 100 km radius and for infinite serial correlation.
In columns 1 to 3, the dependent variable equals 100 if at least one social conflict occurred in district *i* in season *s* in year *t*, and zero otherwise. In columns 4 to 6, the dependent variable equals 100 if at least one subsistence conflict occurred in district *i* in season *s* in year *t*, and zero otherwise. The independent variable Temperature is the seasonal temperature deviation from the long-term seasonal mean (1500-1600) in district *i*, divided by its standard deviation. The other independant variables are defined accordingly. District FE is a full set of 690 district fixed effects. Province x Year FE is the interaction of province dummies with the full set of year fixed effects.

Table 8: Robustness checks: Alternative measures of temperature

| | Social Conflicts | Subsistence Conflicts | Fiscal Conflicts | State authorities--related Conflicts | Other Conflicts |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| Decile 2 | 0.022 | 0.140*** | −0.111* | 0.047 | −0.049 |
| | (0.102) | (0.048) | (0.063) | (0.050) | (0.051) |
| Decile 3 | 0.225** | 0.178*** | −0.001 | 0.032 | −0.022 |
| | (0.112) | (0.050) | (0.074) | (0.042) | (0.051) |
| Decile 4 | 0.382*** | 0.210*** | 0.028 | 0.074* | 0.037 |
| | (0.114) | (0.060) | (0.071) | (0.045) | (0.049) |
| Decile 5 | 0.180 | 0.103* | −0.076 | 0.013 | 0.080 |
| | (0.113) | (0.056) | (0.069) | (0.046) | (0.053) |
| Decile 6 | 0.341*** | 0.274*** | −0.045 | 0.061 | 0.046 |
| | (0.113) | (0.058) | (0.072) | (0.047) | (0.058) |
| Decile 7 | 0.184 | 0.258*** | −0.091 | 0.002 | −0.046 |
| | (0.112) | (0.056) | (0.071) | (0.046) | (0.057) |
| Decile 8 | 0.249** | 0.120** | −0.086 | 0.117*** | 0.045 |
| | (0.117) | (0.053) | (0.074) | (0.045) | (0.057) |
| Decile 9 | 0.421*** | 0.265*** | 0.015 | 0.132** | 0.030 |
| | (0.120) | (0.062) | (0.076) | (0.052) | (0.055) |
| Decile 10 | 0.324*** | 0.146*** | 0.015 | 0.113** | −0.011 |
| | (0.118) | (0.047) | (0.076) | (0.047) | (0.055) |
| District FE | Yes | Yes | Yes | Yes | Yes |
| Province × Year FE | Yes | Yes | Yes | Yes | Yes |
| Observations | 353,970 | 353,970 | 353,970 | 353,970 | 353,970 |

*Notes:* Significant at ***1%, **5%, *10%. LPM estimations. Conley (1999) standard errors in parentheses allowing for spatial correlation within a 100 km radius and for infinite serial correlation.
The dependent variable in column 1 equals 100 if at least one social conflict occurred in district $i$ in season $s$ in year $t$, and zero otherwise. In columns 2 to 5, the other dependent variables are defined accordingly for subsistence-related conflict, fiscal conflict, conflict against state authorities, and other types of conflict, and zero otherwise. The independent variable Decile is an ordered categorical variable ranging from one to ten that indicates the decile that each temperature anomalies in district $i$ is in. District FE is a full set of 690 district fixed effects. Province x Year FE is the interaction of province dummies with the full set of year fixed effects.

Table 9: Robustness checks: District-specific economic and geographic controls

| | Social conflicts | Subsistence conflicts | Fiscal conflicts | State authorities--related conflicts | Other conflicts |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| Temperature | 0.111*** | 0.046** | 0.011 | 0.031*** | 0.013 |
| | (0.036) | (0.020) | (0.016) | (0.011) | (0.014) |
| Controls × Decade | Yes | Yes | Yes | Yes | Yes |
| District FE | Yes | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes | Yes |
| Observations | 353,970 | 353,970 | 353,970 | 353,970 | 353,970 |

*Notes:* Significant at ***1%, **5%, *10%. LPM estimations. Conley (1999) standard errors in parentheses allowing for spatial correlation within a 100 km radius and for infinite serial correlation.
The dependent variable in column 1 equals 100 if at least one social conflict occurred in district $i$ in season $s$ in year $t$, and zero otherwise. In columns 2 to 5, the other dependent variables are defined accordingly for subsistence-related conflict, fiscal conflict, conflict against state authorities, and other types of conflict. The independent variable Temperature is the seasonal temperature deviation from the long-term seasonal mean (1500–1600) in district $i$, divided by its standards deviation. The controls include latitude, topographic index position, distance from Paris (km), distance from the nearest coast (km), a dummy indicating whether there is a crossing of at least two Roman roads in district $i$, urbanisation rate (share of the population in district $i$ living in towns larger than 5,000 inhabitants), a dummy indicating whether a city in district $i$ is the seat of a bishop or an archbishop, a dummy indicating whether the disctrit $i$ falls under an active parliament, a dummy indicating whether the disctrit $i$ falls under the *Cinq Grosses Fermes*, and a dummy indicating whether the disctrit $i$ is exempt from paying salt tax (*Gabelle*). District FE is a full set of 690 district fixed effects. Year FE is a full set of year fixed effects.

Table 10: Robustness checks: Logit estimates

| | Social conflicts | | Subsistence conflicts | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Temperature | 0.068*** | 0.079*** | 0.143*** | 0.143*** |
| | (0.013) | (0.0001) | (0.038) | (0.038) |
| Precipitation | | −0.008*** | | −0.053*** |
| | | (0.0001) | | (0.019) |
| Observations | 353,970 | 353,970 | 353,970 | 353,970 |
| District FE | Yes | Yes | Yes | Yes |
| Province × Year FE | Yes | Yes | Yes | Yes |

*Notes:* Significant at ***1%, **5%, *10%. Logit estimations. Standard errors in parentheses.
In columns 1 and 2, the dependent variable equals one if at least one social conflict occurred in district $i$ in season $s$ in year $t$, and zero otherwise. In columns 3 and 4, the dependent variable equals one if at least one subsistence conflict occurred in district $i$ in season $s$ in year $t$, and zero otherwise. The independent variable Temperature is the seasonal temperature deviation from the long-term seasonal mean (1500–1600) in district $i$, divided by its standard deviation. District FE is a full set of 690 district fixed effects. Province x Year FE is the interaction of province dummies with the full set of year fixed effects.

Table 11: Robustness checks: Exclusion of Paris and years 1788–9

| | Social conflicts | | | Subsistence conflicts | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Temperature | 0.108*** | 0.120*** | 0.109*** | 0.052*** | 0.061*** | 0.056*** |
| | (0.026) | (0.026) | (0.026) | (0.013) | (0.012) | (0.013) |
| Year 1789 | −8.828 | | | −2.067 | | |
| | (8.717) | | | (5.729) | | |
| Year 1788-1789 | | −1.741*** | | | −1.430*** | |
| | | (0.573) | | | (0.461) | |
| Paris | | | −0.810*** | | | −3.047*** |
| | | | (0.147) | | | (0.089) |
| District FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Province × Year FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 353,970 | 353,970 | 353,970 | 353,970 | 353,970 | 353,970 |

*Notes:* Significant at ***1%, **5%, *10%. LPM estimations. Conley (1999) standard errors in parentheses allowing for spatial correlation within a 100 km radius and for infinite serial correlation.
In columns 1 to 3, the dependent variable equals 100 if at least one social conflict occurred in district *i* in season *s* in year *t*, and zero otherwise. In columns 4 to 6, the dependent variable equals 100 if at least one subsistence conflict occurred in district *i* in season *s* in year *t*, and zero otherwise. The independent variable Temperature is the seasonal temperature deviation from the long-term seasonal mean (1500-1600) in district *i*, divided by its standard deviation. 1789 is a dummy variable equal to one if year *t* is 1789, and 0 otherwise. 1788-89 is defined accordingly. Paris is a dummy variable equal to one if district *i* is Paris, and 0 otherwise. District FE is a full set of 690 district fixed effects. Province x Year FE is the interaction of province dummies with the full set of year fixed effects.

Table 12: Robustness check: Province level

| | Social Conflicts | Subsistence Conflicts | Fiscal Conflicts | State authorities--related Conflicts | Other Conflicts |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| Temp. anomalies | 1.340 | 0.348 | 0.215 | 0.520 | 0.400 |
| | (0.351)*** | (0.135)** | (0.241) | (0.213)** | (0.281) |
| Province FE | Yes | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes | Yes |
| Observations | 16,416 | 16,416 | 16,416 | 16,416 | 16,416 |
| Mean DV | 27 | 3.69 | 13.32 | 5.97 | 7.47 |

*Notes:* Significant at ***1%, **5%, *10%. LPM estimations. Conley (1999) standard errors in parentheses allowing for spatial correlation within a 100 km radius and for infinite serial correlation.
The dependent variable in column 1 equals 100 if at least one social conflict occurred in province *j* in season *s* in year *t*. In columns 2 to 5, the other dependent variables are defined accordingly for subsistence-related conflict, fiscal conflict, conflict against state authorities, and other types of conflict. The independent variable Temp. anomalies is the seasonal temperature deviation from the long-term seasonal mean (1500–1600) in province *j*, divided by its standards deviation. Province FE is a full set of 32 district fixed effects. Year FE is a full set of year fixed effects.

Table 13: Robustness checks: Alternative cut-off Conley SE

| | Social conflicts | | | Subsistence conflicts | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Temperature | 0.108*** | 0.108*** | 0.108*** | 0.052*** | 0.052*** | 0.052*** |
| | (0.025) | (0.026) | (0.027) | (0.011) | (0.014) | (0.015) |
| Cluster SE | 50 km | 200 km | 500 km | 50 km | 200 km | 500 km |
| District FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Province × Year FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 353,970 | 353,970 | 353,970 | 353,970 | 353,970 | 353,970 |

*Notes:* Significant at ***1%, **5%, *10%. LPM estimations. Conley (1999) standard errors in parentheses allowing for spatial correlation within a 50, 200, and 500 km radius and for infinite serial correlation.
In columns 1 to 3, the dependent variable equals 100 if at least one social conflict occurred in district *i* in season *s* in year *t*, and zero otherwise. In columns 4 to 6, the dependent variable equals 100 if at least one subsistence conflict occurred in district *i* in season *s* in year *t*, and zero otherwise. The independent variable Temperature is the seasonal temperature deviation from the long-term seasonal mean (1500-1600) in district *i*, divided by its standard deviation. District FE is a full set of 690 district fixed effects. Province x Year FE is the interaction of province dummies with the full set of year fixed effects.

Table 14: Intendant's experience and social conflicts in France (1661–1789)

| | Social conflicts | | | Subsistence conflicts | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Temperature | 0.052 | 0.102*** | 0.052 | 0.135*** | 0.067*** | 0.135*** |
| | (0.085) | (0.029) | (0.085) | (0.055) | (0.016) | (0.055) |
| Temperature | 0.068 | | | −0.092** | | |
| × Local experience | (0.091) | | | (0.056) | | |
| Temperature | | 0.011 | | | −0.015** | |
| × Years of experience | | (0.013) | | | (0.008) | |
| Temperature | | | 0.059 | | | −0.087** |
| × Exp. 1–5 years | | | (0.096) | | | (0.057) |
| Temperature | | | 0.017 | | | −0.084* |
| × Exp. 6–10 years | | | (0.105) | | | (0.060) |
| Temperature | | | 0.134 | | | −0.110** |
| × Exp. > 10 years | | | (0.105) | | | (0.061) |
| District FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Province × Year FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 339,474 | 339,474 | 339,474 | 339,474 | 339,474 | 339,474 |
| Mean DV | 1.87 | 1.87 | 1.87 | 0.28 | 0.28 | 0.28 |

*Notes:* Significant at ***1%, **5%, *10%. LPM estimations. Conley (1999) standard errors in parentheses allowing for spatial correlation within a 100 km radius and for infinite serial correlation.
In columns 1 to 3, the dependent variable equals one if at least one social conflict occurred in district *i* in season *s* in year *t*, and zero otherwise. In columns 4 to 6, the dependent variable equals one if at least one subsistence conflict occurred in district *i* in season *s* in year *t*, and zero otherwise. The independent variable Temperature is the seasonal temperature deviation from the long-term seasonal mean (1500–1600) in district *i*, divided by its standard deviation. Local experience is dummy variable equal to one if the intendant in province *j* has some local experience, and zero otherwise. Years of experience is the total number of years of experience of intendants in province *j*. Exp. 1–5 years is a dummy variable equal to one if the intendant in province *j* has between one year and five years of experience in that province, and zero otherwise. Exp. 6–10 years is a dummy variable equal to one if the intendant in province *j* has between six year and ten years of experience in that province, and zero otherwise. Exp. > 10 years is a dummy variable equal to one if the intendant in province *j* has more than 10 years of experience in that province, and zero otherwise. District FE is a full set of 690 district fixed effects. Province x Year FE is the interaction of province dummies with the full set of year fixed effects.

Table 15: Intendant's experience and social conflicts in France (1703–13)

| | Social conflicts | | | Subsistence conflicts | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Temperature | 0.075 | 0.200 | 0.075 | 1.116*** | 0.495*** | 1.116*** |
| | (0.456) | (0.168) | (0.456) | (0.332) | (0.108) | (0.332) |
| Temperature | 0.164 | | | −0.816** | | |
| × Local experience | (0.483) | | | (0.347) | | |
| Temperature | | 0.024 | | | −0.123** | |
| × Years of experience | | (0.074) | | | (0.053) | |
| Temperature | | | 0.228 | | | −0.783** |
| × Exp. 1–5 years | | | (0.493) | | | (0.353) |
| Temperature | | | −0.557 | | | −1.001** |
| × Exp. 6–10 years | | | (0.659) | | | (0.451) |
| Temperature | | | 0.422 | | | −0.795** |
| × Exp. > 10 years | | | (0.562) | | | (0.392) |
| District FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Province × Year FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 29,128 | 29,128 | 29,128 | 29,128 | 29,128 | 29,128 |
| Mean DV | 2.71 | 2.71 | 2.71 | 0.63 | 0.63 | 0.63 |

*Notes:* Significant at ***1%, **5%, *10%. LPM estimations. Conley (1999) standard errors in parentheses allowing for spatial correlation within a 100 km radius and for infinite serial correlation.
In columns 1 to 3, the dependent variable equals one if at least one social conflict occurred in district $i$ in season $s$ in year $t$, and zero otherwise. In columns 4 to 6, the dependent variable equals one if at least one subsistence conflict occurred in district $i$ in season $s$ in year $t$, and zero otherwise. The independent variable Temperature is the seasonal temperature deviation from the long-term seasonal mean (1500–1600) in district $i$, divided by its standard deviation. Local experience is dummy variable equal to one if the intendant in province $j$ has some local experience, and zero otherwise. Years of experience is the total number of years of experience of intendants in province $j$. Exp. 1–5 years is a dummy variable equal to one if the intendant in province $j$ has between one year and five years of experience in that province, and zero otherwise. Exp. 6–10 years is a dummy variable equal to one if the intendant in province $j$ has between six year and ten years of experience in that province, and zero otherwise. Exp. $>$ 10 years is a dummy variable equal to one if the intendant in province $j$ has more than 10 years of experience in that province, and zero otherwise. District FE is a full set of 690 district fixed effects. Province x Year FE is the interaction of province dummies with the full set of year fixed effects.

Table 16: Intendant's prior experience and social conflicts in France (1661–1789)

| | Social conflicts | | | Subsistence conflicts | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Temperature | 0.059 | 0.133*** | 0.059 | 0.034* | 0.065*** | 0.034* |
| | (0.038) | (0.030) | (0.038) | (0.018) | (0.014) | (0.018) |
| Temperature | 0.104* | | | 0.043 | | |
| × Prior experience | (0.053) | | | (0.026) | | |
| Temperature × Years of | | 0.015* | | | 0.007* | |
| prior experience | | (0.008) | | | (0.004) | |
| Temperature × Prior | | | 0.127** | | | 0.041 |
| exp. 1–5 years | | | (0.063) | | | (0.032) |
| Temperature × Prior | | | 0.132* | | | 0.043 |
| exp. 6–10 years | | | (0.080) | | | (0.036) |
| Temperature × Prior | | | 0.014 | | | 0.044 |
| exp. > 10 years | | | (0.093) | | | (0.049) |
| District FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Province × Year FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 339,474 | 339,474 | 339,474 | 339,474 | 339,474 | 339,474 |
| Mean DV | 1.87 | 1.87 | 1.87 | 0.28 | 0.28 | 0.28 |

*Notes:* Significant at ***1%, **5%, *10%. LPM estimations. Conley (1999) standard errors in parentheses allowing for spatial correlation within a 100 km radius and for infinite serial correlation.
In columns 1 to 3, the dependent variable equals one if at least one social conflict occurred in district *i* in season *s* in year *t*, and zero otherwise. In columns 4 to 6, the dependent variable equals one if at least one subsistence conflict occurred in district *i* in season *s* in year *t*, and zero otherwise. The independent variable Temperature is the seasonal temperature deviation from the long-term seasonal mean (1500–1600) in district *i*, divided by its standard deviation. Prior experience is dummy variable equal to one if the intendant in province *j* has some prior experience as intendant in another province, and zero otherwise. Years of prior experience is the log of the total number of years of experience of intendants in the position before being appointed in province *j*. Prior exp. 1–5 years is a dummy variable equal to one if the intendant in province *j* has between one year and five years of experience in another province prior to his appointement in province *j*, and zero otherwise. Exp. 6–10 years is a dummy variable equal to one if the intendant in province *j* has between six years and ten years of experience in another province prior to his appointement in province *j*, and zero otherwise. Exp. > 10 years is a dummy variable equal to one if the intendant in province *j* has more than 10 years of experience in another province prior to his appointement in province *j*, and zero otherwise. District FE is a full set of 690 district fixed effects. Province x Year FE is the interaction of provinces dummies with the full set of year fixed effects.

Table 17: Intendant's prior experience and social conflicts in France (1703–13)

| | Social conflicts | | | Subsistence conflicts | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Temperature | 0.221 | 0.209 | 0.221 | 0.466*** | 0.458*** | 0.466*** |
| | (0.252) | (0.168) | (0.252) | (0.164) | (0.107) | (0.164) |
| No local exp. | −0.024 | | | −0.013 | | |
| | (0.329) | | | (0.210) | | |
| Years of local exp. | | 0.001 | | | 0.00005 | |
| | | (0.052) | | | (0.034) | |
| Temperature × Prior | | | −0.120 | | | 0.007 |
| exp. 1–5 years | | | (0.400) | | | (0.247) |
| Temperature × Prior | | | −0.098 | | | −0.120 |
| exp. 6–10 years | | | (0.360) | | | (0.262) |
| Temperature × Prior | | | 0.755 | | | 0.270 |
| exp. > 10 years | | | (0.949) | | | (0.500) |
| District FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Province × Year FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 29,128 | 29,128 | 29,128 | 29,128 | 29,128 | 29,128 |
| Mean DV | 2.71 | 2.71 | 2.71 | 0.63 | 0.63 | 0.63 |

*Notes:* Significant at ***1%, **5%, *10%. LPM estimations. Conley (1999) standard errors in parentheses allowing for spatial correlation within a 100 km radius and for infinite serial correlation.
In columns 1 to 3, the dependent variable equals one if at least one social conflict occurred in district $i$ in season $s$ in year $t$, and zero otherwise. In columns 4 to 6, the dependent variable equals one if at least one subsistence conflict occurred in district $i$ in season $s$ in year $t$, and zero otherwise. The independent variable Temperature is the seasonal temperature deviation from the long-term seasonal mean (1500–1600) in district $i$, divided by its standard deviation. Prior experience is dummy variable equal to one if the intendant in province $j$ has some prior experience as intendant in another province, and zero otherwise. Years of prior experience is the log of the total number of years of experience of intendants in the position before being appointed in province $j$. Prior exp. 1–5 years is a dummy variable equal to one if the intendant in province $j$ has between one year and five years of experience in another province prior to his appointement in province $j$, and zero otherwise. Exp. 6–10 years is a dummy variable equal to one if the intendant in province $j$ has between six years and ten years of experience in another province prior to his appointement in province $j$, and zero otherwise. Exp. $>$ 10 years is a dummy variable equal to one if the intendant in province $j$ has more than 10 years of experience in another province prior to his appointement in province $j$, and zero otherwise. District FE is a full set of 690 district fixed effects. Province x Year FE is the interaction of provinces dummies with the full set of year fixed effects.

Table 18: Monastic charity and conflicts in France (1661–1789)

| | Social conflicts | | | Subsistence conflicts | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Temperature | 0.700*** | 0.133*** | 0.045 | 0.651*** | 0.033* | −0.024 |
| | (0.214) | (0.046) | (0.071) | (0.179) | (0.020) | (0.032) |
| Temperature | −5.750 | | | −5.492** | | |
| × Edict 1694 | (3.726) | | | (2.987) | | |
| Temperature | | −0.045 | | | 0.077* | |
| × Income 1780 | | (0.124) | | | (0.052) | |
| Temperature | | | 0.018 | | | 0.022*** |
| × Nob. Index | | | (0.021) | | | (0.010) |
| District FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Province × Year FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 8,200 | 317,034 | 353,970 | 8,200 | 317,034 | 353,970 |
| Mean DV | 1.32 | 1.32 | 1.32 | 0.53 | 0.53 | 0.53 |

*Notes:* Significant at ***1%, **5%, *10%. LPM estimations. Conley (1999) standard errors in parentheses allowing for spatial correlation within a 100 km radius and for infinite serial correlation.
In columns 1 to 3, the dependent variable equals one if at least one social conflict occurred in district $i$ in season $s$ in year $t$. In columns 4 to 6, the dependent variable equals one if at least one subsistence conflict occurred in district $i$ in season $s$ in year $t$. The independent variable Temperature is the seasonal temperature deviation from the long-term seasonal mean (1500–1600) in district $i$, divided by its standard deviation. Edict 1694 is a continuous variable equal to 0 if abbeys in district $i$ are not listed in the Edict of 20 November 1694, and equal to the log of abbeys income otherwise. Income 1780 is the log of abbeys income per capita in 1780 in district $i$. Nob. Index is a continuous variable denoting the density of noble families in district $i$ in year $t$. District FE is a full set of 690 district fixed effects. Province x Year FE is the interaction of province dummies with the full set of year fixed effects.

# Online Appendix

## A Temperature shocks, grain prices and social conflicts

This section documents the transmission mechanism between weather shocks and the onset of social conflicts. In line with previous studies, I show that temperature shocks had a direct and significant impact on the level of wheat prices (Galloway, 1986, 1994). Since consumers have to spend more of their income on bread, with stable or lower earnings, high grains prices translate directly into a reduction of real wages. The level of social conflicts, and in particular of subsistence-related conflicts, increases as a response to the transitory negative income shocks (Nicolas, 2002, pp. 346–99; Molinier, 1985, pp. 37–43).

**Weather and crop prices.** Weak market integration meant that wheat prices were more likely to respond to local weather-induced variations in local agricultural output. I first estimate the effect of temperature shocks on wheat prices using panel regressions where I link the price of wheat in each province $j$ to summer temperature shocks in that province over the 1756–89 period. In doing so, I follow Franck and Michalopoulos (2017) and estimate a model of the form:

$$Price_{jt} = \alpha + \beta\, Temperature_{jt} + \delta_j + \delta_d + \epsilon_{jt} \tag{4}$$

where $Price_{jt}$ is the log of the price of wheat in province $j$ in year $t$, $Temperature_{jt}$ is the measure of temperature shock in the summer of year $t$ in province $j$. The fixed effects $\delta_j$ account for time-invariant province characteristics. $\delta_d$ are the time (decade) fixed effects, and account for common time shocks that affect all provinces.

I report the regression results in Table 19. To account for the fact that the relationship between summer temperature shocks and the price of wheat could be non-linear, I include a quadratic term in all specifications. Columns 2 to 6 include summer precipitation shocks to reduce the risk of omitted variables bias. Due to seeds scarcity, the effect of harvest shock might prevail from one year to another, independently from the weather conditions. In columns 3 to 6, I add a measure of previous harvest to take into account this possibility.

Results in columns 1 to 6 suggest that year-on-year variations in summer temperature had a non-linear effect on the price of wheat, whit large positive temperature shocks increasing significantly the prices of wheat (Figure 26). These results are consistent with the idea that higher summer temperature could be detrimental to agricultural output, and that markets did

not completely smooth the effect of weather fluctuations. On August 30, 1699, the city council of Sérignan reported that "there will be little grains and no grapes in Sérignan because of the drought and the extreme sterility of the summer, and that the livestock can barely survive due the lack of grass".[112] In the next few months the price of wheat reached £147 per septier (65.59 litres) in the neighbouring market of Béziers– a 12 per cent increase as compared to the 10-year moving average (Geraud-Perracha, 1955, pp. 334–41). These results are in line with Franck and Michalopoulos (2017) who show that increases in temperature shocks in France over the 1797–1800 period resulted in higher wheat prices. Waldinger (2014) studies the effect of drought in France during summer 1788 and finds that warmer temperature had a positive and significant effect on the likelihood of peasant revolts in agricultural areas, supporting the idea that inclement weather conditions had a direct impact on individuals living standards and their incitations to rebel. In Table 21, I present results using my sample of wheat prices at the district level for years 1767–8. While these results are in line with those of the Labrousse's sample, the much larger coefficients could be explained by the fact that the relationship between temperature shocks and the price of wheat is better estimated at the district level. Indeed, Labrousse selected only one series of wheat prices per province to construct his sample, and the aggregation of temperature shocks at the level of provinces may smooth some of the local variations, reducing the fit between the two variables.

**Crop prices and social conflicts.** Combining data from various sources introduced in Section 3, I then estimate the effect of crop prices on social conflicts via Two-Stage Least Squares (2SLS) using the following specification:

$$Conflict_{jt} = \alpha + \beta\, Price_{jt} + \delta_j + \delta_t + \epsilon_{jt} \tag{5}$$

where $Conflict_{jt}$ is a dummy variable equal to one if at least one social conflict occurred in province $j$ in year $t$, and $Price_{jt}$ is the log of the price of wheat in province $j$ in year $t$. The fixed effects $\delta_j$ account for time-invariant province characteristics. $\delta_d$ are the time (decade) fixed effects, and account for common time shocks that affect all provinces. All estimations use robust standard errors clustered at the province level.

In the first stage, $Price_{jt}$, the log of the price of wheat in province $j$ in year $t$, is instrumented by $Temperature_{jt}$– the measure of temperature shock in the summer of year $t$ in province $j$– and

[112] Archives Municipales (hereafter A.M.) Sérignan, Délibérations consulaire, 30–8–1699 (as cited in Molinier (1968, pp. 33–4)).

its quadratic value:[113]

$$Price_{jt} = \alpha + \gamma_1 Temperature_{jt} + \gamma_2 (Temperature_{jt})^2 + \delta_j + \delta_t + \epsilon_{jt} \quad (6)$$

Table 20 contains the results from estimating equations 5 and 6.[114] In columns 1 and 2, I report the estimated effect of wheat prices on the likelihood of social conflicts broadly defined. I find no significant relationship between the level of wheat prices and the onset of social conflict at the province level between 1756 and 1789. As explained in Section 3.1, the variable *Social conflict* encompasses many different types of conflict, many of which had plausibly different drivers. In the parish register of Auxy in the south of Burgundy, the priest reported that bad weather conditions in 1770 resulted in high wheat and rye prices all year long, even after the harvest, which caused several riots at the market.[115] During the spring 1770, two food riots occurred in Troyes after wheat prices hit ten-year highs. On 13 July 1770, the *subdélégué* of Troyes, M. Paillot, warned the intendant that because wheat prices were high, thousands of manufacturing workers saw their real wages dropping. He further added that the situation risked to result again in disturbance if no action was taken. [116] In Section 2.1, I provide more historical evidence to suggest that weather shocks had an impact on social conflicts through its effect on harvests and the induced transitory poverty shocks. That wheat prices and temperature shocks have no effect on the onset of social conflicts is thus non-surprising. In columns 3 and 4, I examine the effect of wheat prices on subsistence-related conflicts, which included events like food riots, the looting of public granary and the like. The estimates reveal that the level of wheat prices has a positive and significant impact on the likelihood

[113] Dieterle and Snell (2016) emphasise the importance of using a quadratic term in the instrument in the first stage. Using only linear first stage may conceal information on the nature of heterogeneous effects. For instance, the authors investigate the effect of including a quadratic term in the first stage of Becker and Woessmann (2009)'s estimate. They show that effect of the instrument– the distance from Wittenberg– varies considerably in size and in sign across different estimates once a quadratic term is included. Dieterle and Snell repeat the exercise for 13 papers published between 2008 and 2013 in *American Economic Association* journals. They find eight papers with significant non-linearities, including six that have a statistically different second stage estimates.

[114] The exclusion restriction requires that temperature shocks in the summer of year $t$ in province $j$ have no effect on conflicts in year $t$ in province $j$ other than through its effects on economic (agricultural) output. There are two main concerns. First, temperature shocks could have an effect on state capacity if it reduces the ability of the state to enforce the law or to move troops around the kingdom. While temperature shock could affected state finance through a drop in income tax revenue, the effect would materialise in year $t+1$ and is unlikely to affect the onset of social conflicts in year $t$. Similarly, there is no plausible reason for which summer temperature shock would reduce the mobility of the troops. Second, it is hypothesised that extreme temperature (heat) can directly induce violent behaviour and conflict through its effect on the level serotonin. However, the empirical support for this channel is found at very short time scale, i.e. hours or day. It is therefore unlikely that seasonal temperature average could affect the onset of social conflicts through this channel (Carleton, Hsiang and Burke, 2016, p. 497).

[115] A.D. Saône-et-Loire, Registre des Baptêmes et Mariages de la commune d'Auxy (1758–1791), folio 94.

[116] A.D. Aube, C 1909, Approvisionnement et prix des grains, 1656–1789 (as cited in Ricommard (1934, pp. 211–2, 288–90).

of subsistence-related conflict. One standard deviation increase in temperature led to a seven fold increase in the likelihood of subsistence-related conflict. The F-statistic of the instrument in the first stage is 59.86, suggesting that summer temperature shock is a strong instrument for the level of wheat price in a province. In order to assess the robustness of these results, I also investigate this relationship at the district level using the 1767–8 sample. The results are reported in Table 22. The size of the estimated coefficients are smaller, but nonetheless positive and significant (columns 3 and 4), providing further support to the idea that the level of wheat prices was one of the main drivers of subsistence-related conflicts, but not of social conflicts more broadly defined.

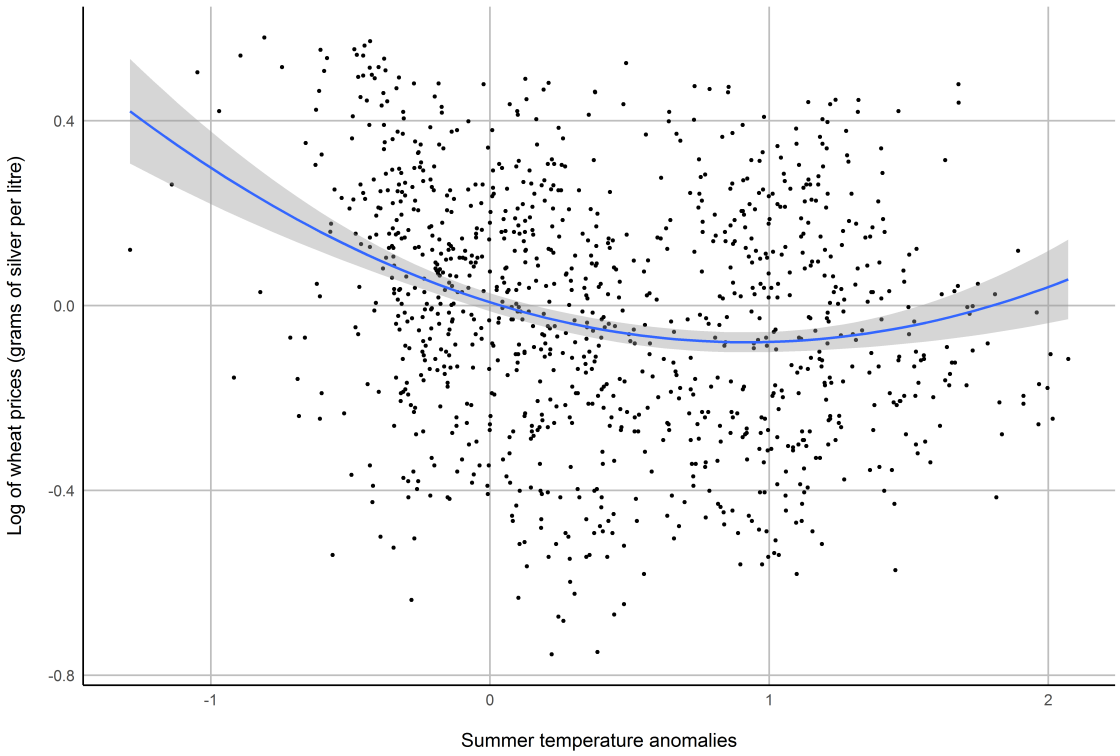



Figure 26: Summer temperature shocks and wheat prices (1756–89)

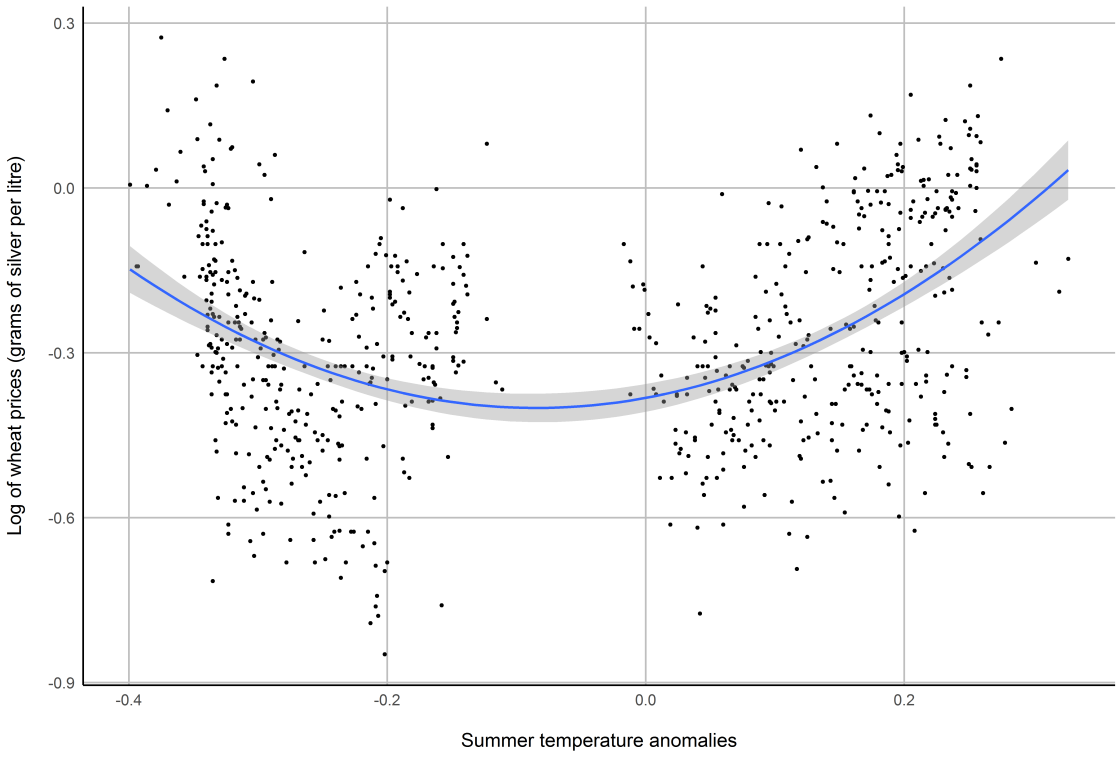



Figure 27: Summer temperature shocks and wheat prices (1767–8)

Table 19: Temperature shocks and wheat prices in France (1756–89)

| | Log of wheat prices (grams of silver per litre) | | | | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Summer temperature | −0.189*** | −0.206*** | −0.209*** | −0.162*** | −0.135*** | −0.103*** |
| | (0.016) | (0.016) | (0.015) | (0.019) | (0.012) | (0.011) |
| Summer temperature$^2$ | 0.103*** | 0.101*** | 0.115*** | 0.084*** | 0.061*** | 0.035*** |
| | (0.014) | (0.014) | (0.015) | (0.016) | (0.010) | (0.008) |
| Log of wheat prices *t-1* | | | | | | 0.518*** |
| | | | | | | (0.024) |
| Province FE | No | No | No | Yes | Yes | Yes |
| Province × Decade FE | No | No | No | No | Yes | Yes |
| Observations | 1,054 | 1,054 | 1,054 | 1,054 | 1,054 | 1,023 |
| $R^2$ | 0.067 | 0.074 | 0.091 | 0.291 | 0.601 | 0.659 |

*Notes:* Significant at ***1%, **5%, *10%. OLS estimations. Standard errors clustered at the provinces level in parentheses.
The dependent variable is the log of the wheat price in grams of silver per litre in province *j* in year *t*. The independent variable summertemperature is the summer temperature deviation from the long-term seasonal mean (1500–1600) in province *j*, divided by its standard deviation. The other independant variables are defined accordingly. Columns 2 to 6 include summerprecipiation in province *j* in year *t*. Columns 3 to 6 include summertemperature in province *j* in year *t-1*. Column 6 includes the log of the wheat price in grams of silver per litre in province *j* in year *t-1*. Province FE is a full set of province fixed effects. Province x Decade FE is the interaction of provinces dummies with decade fixed effects.

Table 20: Wheat prices and social conflicts in France (1756–89)

| | Social conflict | | Subsistence conflict | |
|---|---|---|---|---|
| | OLS | 2SLS | OLS | 2SLS |
| | (1) | (2) | (3) | (4) |
| Wheat prices | 7.279 | | 86.596*** | |
| | (5.523) | | (7.696) | |
| Wheat prices fitted | | −33.795 | | 120.070*** |
| | | (25.258) | | (16.385) |
| District FE | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes |
| Observations | 1,054 | 1,054 | 1,054 | 1,054 |
| $R^2$ | 0.376 | 0.347 | 0.326 | 0.301 |
| F-Stat | | 59.86 | | 59.86 |
| Mean DV | 74.29 | 74.29 | 19.17 | 19.17 |

*Notes:* Significant at ***1%, **5%, *10%. Standard errors clustered at the provinces level in parentheses.
In columns 1 and 2, the dependent variable equals 100 if at least one social conflict occurred in district *i* in year *t*. In columns 3 and 4, the dependent variable equals 100 if at least one subsistence conflict occurred in district *i* in year *t*. In columns 1 and 3, the independent variable is the log of the wheat price in grams of silver per litre in province *j* in year *t*. In columns 2 and 4, I instrument for the log of wheat prices with summer temperature deviation from the long-term seasonal mean (1500–1600), divided by its standard deviation, as well as its quadratic value. Province FE is a full set of province fixed effects. Year FE is a set of year fixed effects.

Table 21: Temperature shocks and wheat prices in France (1767–68)

| | Log of wheat prices (grams of silver per litre) | | | | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Summer temperature | 0.157* | 0.433*** | 0.100 | 0.242 | −0.057 | −0.814*** |
| | (0.088) | (0.065) | (0.101) | (0.153) | (0.134) | (0.258) |
| Summer temperature$^2$ | | 2.554*** | 3.017*** | 3.231*** | 2.514*** | 2.871*** |
| | | (0.439) | (0.391) | (0.406) | (0.305) | (0.326) |
| Province FE | No | No | No | No | Yes | Yes |
| Year FE | No | No | No | No | No | Yes |
| Observations | 708 | 708 | 708 | 708 | 708 | 708 |
| $R^2$ | 0.029 | 0.162 | 0.219 | 0.247 | 0.709 | 0.715 |

*Notes:* Significant at ***1%, **5%, *10%. OLS estimations. Standard errors clustered at the provinces level in parentheses.
The dependent variable is the log of the maximum wheat price in grams of silver per litre in district *i* in year *t*. Data include 352 markets in 1767 and 356 markets in 1768. The independent variable summertemperature is the summer temperature deviation from the long-term seasonal mean (1500–1600) in district *i*, divided by its summer deviation. The other independant variables are defined accordingly. Columns 3 to 6 include summer precipiation anomalies in district *i* in year *t*. Columns 4 to 6 include summertemperature in district *i* in year *t-1*. Province FE is a full set of province fixed effects. Year FE is a set of year fixed effects.

Table 22: Wheat prices and social conflicts in France (1767–68)

| | Social conflict | | Subsistence conflict | |
|---|---|---|---|---|
| | OLS | 2SLS | OLS | 2SLS |
| | (1) | (2) | (3) | (4) |
| Wheat prices | 8.520 | | 14.251** | |
| | (8.571) | | (6.922) | |
| Wheat prices fitted | | 12.203 | | 18.681* |
| | | (18.388) | | (10.689) |
| Province FE | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes |
| Observations | 708 | 708 | 708 | 708 |
| $R^2$ | 0.127 | 0.127 | 0.125 | 0.125 |
| F-Stat | | 35.71 | | 35.71 |
| Mean DV | 14.97 | 14.97 | 6.92 | 6.92 |

*Notes:* Significant at ***1%, **5%, *10%. Standard errors clustered at the provinces level in parentheses.
In columns 1 and 2, the dependent variable equals 100 if at least one social conflict occurred in district *i* in year *t*. In columns 3 and 4, the dependent variable equals 100 if at least one subsistence conflict occurred in district *i* in year *t*. In columns 1 and 3, the independent variable is the log of the maximum wheat price in grams of silver per litre in district *i* in year *t*. In columns 2 and 4, I instrument for the log of the maximum wheat prices with seasonal temperature deviation from the long-term seasonal mean (1500–1600), divided by their standards deviation, as well as their quadratic value. Province FE is a full set of province fixed effects. Year FE is a set of year fixed effects.

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